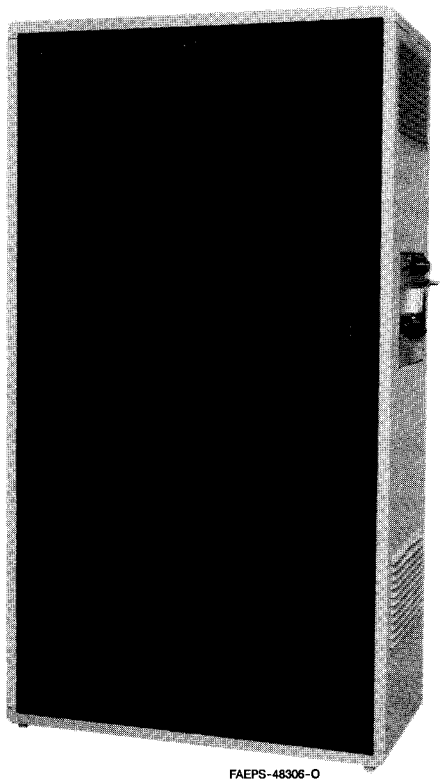

Figure 1. Typical Low Power ***PURC 5000*** *Station (Door On)*

1. INTRODUCTION

1.1 *PURC 5000* STATION

Motorola *PURC 5000* stations featuring the Advanced Control Board (ACB) introduce a common hardware platform to implement simulcast FM paging transmitters, link transmitters, and link repeaters. Non-simulcast paging transmitters are not supported by the ACB. The transmitters are offered with Paging Universal Remote Control (*PURC*), Tone Remote Control* (TRC), or Motorola Digital Remote Control (DRC). Link transmitters and repeaters can now operate with either TRC* or DRC control.

PURC TRC* stations use High Level Guard Tone (HLGT) and function tones to control the base station operating modes. TRC* stations are compatible with existing controllers which comply with the *PURC* TRC signalling format, i.e., Simulcast System Controller (SSC) or a Paging terminal which supports *PURC* signalling.

The asterisk (*) signifies that the feature was not offered at the time of the printing of this manual. However, when available, the feature will operate as referenced in the manual.

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Motorola DRC stations use *MDC-1200* signalling to control station operating modes, interrogate stations for diagnostic information, and remotely modify station parameters. *MDC-1200* is a Motorola developed signalling protocol designed to provide very reliable performance under degraded signal-to-noise channel conditions. *MDC-1200* is referred to as *Stat-Alert* signalling in some text.

DRC stations are compatible with the Motorola Digital Diagnostic Controller (DDC) or the Motorola *Advanced Simulcast Controller* (ASC). The DRC command set has been expanded on the new DRC paging station with Advanced Control to allow for increased information handling and support for new station and system features. This expanded DRC communications is also referred to as DRC II. Motorola's first offering of DRC is commonly referred to as DRC I. The new Advanced Control board can handle both DRC I and DRC II communications.

DRC equipped link transmitters and repeaters, when controlled by an ASC, have the added capability of individual communications for both diagnostic messaging and positive control. Maximum station and system capabilities are achieved when an ASC controls the *PURC 5000* equipped with an Advanced Control board. Link transmitters and repeaters must also be equipped with an Advanced Control board to exercise full station and system capabilities.

Motorola paging base stations can accommodate two-tone, 5/6 tone (decimal digit), and binary FSK-NRZ signalling up to 1200 baud. The stations require only a single simplex control path, either a 2-wire wireline or a link receiver. Stations can also be controlled locally with TTL type discrete signals or via an RS232 interface for added system flexibility. DRC stations can communicate with a DDC or ASC either over-the-air on the paging channel frequency or via a return dedicated 2-wire wireline. For over-the-air communications, it is required to have an on-channel receiver (*Spectra-TAC* receiver system for large coverage areas) which will route messages back to the DDC or ASC via a 2-wire wireline.

1.2 DRC STATION IDENTIFICATION AND COMMUNICATION

Extensive provisions have been included to provide maximum system flexibility in communicating with stations. The stations are programmed with a common user defined System ID ranging from 0 to 15. The System ID defines the common ID for a group of transmitters that are to be controlled by a DRC controller. If the controller and stations do not have the same System ID then communication is not allowed. Co-channel interference for DRC RF link systems is avoided by ensuring that the System ID's are different for the interfering systems. Each station is also assigned a unique Individual Station ID which differentiates stations common to a single System ID. The Individual Station ID allows the controller to directly communicate with one and only one station at a time. The station's Individual Station ID can have a value ranging from 0 to 1023. The stations also have the ability to be programmed to perform sector paging. Each station can be a member of up to 16 of the possible 255 sectors.

DRC I stations introduced Automatic Over-the-Air Diagnostics alarm reporting or return wireline diagnostic alarm reporting capability, depending on the system configuration. For over-the-air diagnostic reporting, the system is temporarily disabled from paging since the paging channel is used for the reporting. For return wireline diagnostics alarm reporting system configurations, the need for a *Spectra-TAC* monitor receiver system is eliminated. The controller can be programmed to poll all stations enabled for polled diagnostics 5 times a day on the hour and can poll an additional 16 stations which are considered critical to the system an additional 5 times on the hour. Manual diagnostics can be invoked at any time by the system operator to individually communicate with a single station for diagnostic reporting or testing. DRC I systems have limited flexibility for diagnostic reporting regardless of the diagnostic return path. The controller locks out the system while diagnostics are in progress.

DRC II Advanced Control paging stations, when controlled by an ASC, allow for new system features and capabilities to minimize paging down time and increase diagnostic information returned. The DRC I system utilizes simplex communication between controller and base station whereas the ACB and ASC (depending on the system configuration) can support paging and report alarm and diagnostic information simultaneously. As always, the system operator can manually interrogate a station at any time for specific alarm information.

1.3 ALARM REPORTING

Several modes of automatic diagnostics alarm reporting are now available on DRC II for over-the-air and return wireline diagnostic alarm reporting. Automatic diagnostic and alarm reporting can be divided into four modes called **Polled Individual, Polled Group, Randomized,** and **Unsolicited.**

The **Polled Individual** method returns forward power, reflected power, and status alarm information. Any stations which have active alarms require further detailed interrogation. In this manner the minimum amount of communication is required to get full station diagnostics in a system.

The **Polled Group** method is similar to the Polled Individual method except only one outbound message is sent for a group of stations. The stations will report back in a time slot based on their Individual ID. In this manner, outbound messages are held to minimum. For an over-the-air return diagnostic message path, full system benefit is not achieved. However, when the return

diagnostic message path is a wireline system, the controller can resume paging as soon as it sends out the Polled Group message. The station can simultaneously page and report diagnostics in its appropriate time slot.

The **Randomized** method utilizes a message which requires only those stations with alarms to report during a time interval. To avoid collisions, the stations with active alarms encode the messages based on a random start time, which may differ from station to station. The *ASC* will further interrogate stations that report back.

The **Unsolicited** method is for either wireline return paths or for stations which have a dial-out modem connected to a dial-up phone line. Whenever the station senses a potential problem, the ASC will be informed as soon as possible and the station will continue reporting the alarm until the ASC services the station. Dial-up phone lines will automatically prevent data collisions when auto dial modems are used because the ASC can only service one station at a time. The dedicated return wireline path system utilizes a random timer to initiate message reporting. Messages will be continuously sent until acknowledged by the ASC. This ensures that all stations with alarms will report to the ASC even in the event of a message collision.

As an added feature, the base stations maintain a 256 event error log for storing alarm information. The error log is accessible by the ASC.

When stations are equipped with the optional Motorola Internal Diagnostic Modem,* with battery backup, loss of AC power will be reported.

Stations equipped with an auto answer Hayes compatible modem can be called via the phone lines and interrogated at any time.

1.4 STATION HARDWARE AND FEATURES

1.4.1 Station Hardware

The new hardware platform incorporates a Motorola 68HC11 microprocessor supporting the Motorola 56001 Digital Signal Processor (DSP) along with 3 Motorola designed Application Specific Integrated Circuits (ASIC's). This core hardware allows increased flexibility. Audio filtering and processing traditionally performed by discrete hardware is now implemented in software. ASIC technology has increased the logic input/output capabilities whereby numerous station features are standard and merely require control signal interface at the station junction box.

1.4.2 Station Features

Standard features with the ACB include key-on-data, local keying control, RS232 interface, Local Area Network (LAN) interface, airtime counters, and wildcard inputs and outputs. As an option, Hot Standby and N + 1 Redundancy are facilitated with the ACB.

Electronic control of station parameters allows for the station to be configured locally via the front panel keypad and alpha numeric display, or remotely via an RS232 serial port or a DRC controller. Limited operation is allowed with the DDC since it is superceded by the ASC which supports both DRC I and DRC II. Main station parameters include station input level gain, output analog deviation, binary deviation, propagation delay, station system ID, station individual ID, forward and reflected power alarm trip points along with a variety of station alarms which can be individually enabled or disabled. This electronic tuning capability in the base station allows the ASC controller the capability to automatically equalize simulcast parameters such as gain, carrier frequency and phase delay remotely.

The Remote Frequency Adjust feature allows a digital remote controller to electrically steer the Ultra High Stability Oscillator (UHSO), thereby controlling the carrier frequency for simulcast netting. This capability is provided by Advanced Control whenever the DRC option is present. Refer to Table 1 for frequency adjust steps.

Two new features provided by the ACB equipped paging station include delta delay detect and remote carrier frequency adjust. Delta delay detect is useful when the control path distribution medium to base stations fluctuates from station to station. In a simulcast environment this could result in missed pages in the overlap areas. Once the system has been equalized, it is not necessary to keep rechecking stations which are stable; it is important, however, to locate a station that has deviated from the simulcast equalization settings. Each base station continually monitors timing bursts sent out from the ASC after a successful system equalization. These timing bursts mark a relative time interval which implies that the control path medium is constant relative to the system equalization. If this delta time interval has changed, it implies a change in the propagation delay of the control path. Upon detecting an exceeded user set time interval, the station will alarm the ASC that it needs to be re-equalized. Thus, only those stations with the alarm must be re-equalized, not the entire system.

The automatic carrier frequency measurement feature allows the base stations to measure their own HSO or UHSO and determine how much they differ from a reference which is located at the controller site. The controller initiates a start counter and stop counter command which determines the period for the count cycle. Prior to the termination of the count cycle, a system equalization must be performed to ensure that a propagation delay change has not occurred in the control path medium. If a change in the control path has occurred, then the station cannot be adjusted on this pass and will have to be corrected on the next interval.

Table 1. Average Frequency Change per Step			
BAND	**MINIMUM CHANGE FOR SINGLE STEP**	**AVERAGE CHANGE FOR SINGLE STEP**	**AVERAGE CHANGE FOR 100 STEPS (50 STEPS)**
VHF (150 MHz)	0.15 Hz	0.225 Hz	22.5 Hz
280 MHz	0.30 Hz	0.450 Hz	45.0 Hz
UHF (450 MHz)	0.45 Hz	0.675 Hz	67.5 Hz
900 MHz	0.90 Hz	1.350 Hz	135.0 Hz

1.5 RELATED SERVICE MANUALS

This section describes the operation for all bands of the *PURC 5000* stations. For more information on circuit details, troubleshooting, and band-specific issues, see the appropriate Service Manual section. For more information on options and system planning, see the appropriate station service manual. Table 2 lists all related *PURC 5000* manuals and their part numbers.

Table 2. List of PURC 5000 Manuals	
6881067E50	VHF *PURC 5000* Service Manual
6881084E75	280 MHz *PURC 5000* Service Manual
6881077E35	UHF *PURC 5000* Service Manual
6881064E05	900 MHz *PURC 5000* Service Manual
6806907W44	900 MHz 300 W *PURC 5000* Service Manual

2. STATION ELEMENTS

2.1 CABINET

NOTE

The following section does not apply to the 300 W 900 MHz station. See manual referenced in Table 1 for details.

The station cabinet consists of a standard 19-inch wide rack-mount internal frame, a vinyl-covered steel wraparound skin, top and bottom plastic covers, and a door, as shown in Figure 1. The cabinet is designed for indoor installation, and may be stacked at site installations using an optional station stacking hardware kit.

When the front door is removed, all major internal assemblies are accessible from the front of the cabinet (see Figure 5) and either tilt outward or are slide mounted to facilitate maintenance. No rear access is necessary while servicing the station.

2.2 JUNCTION BOX

NOTE

The following section does not apply to the 300 W 900 MHz station. See manual referenced in Table 2 for details.

The Junction box, flush-mounted in the right side of the cabinet, provides facilities for all external connections to the station. These include AC and DC power connections, RF connections, and wireline audio connections. Three 25-pin D-type connectors are provided on the junction box. J1 is used for RS232 interface for a modem or direct PC connection. J2 and J3 are miscellaneous I/O pins. All connectors come standard with the station. No additional holes need be drilled or cut in the exterior surface of the cabinet for installation. Line transient protection is provided at the wireline input connectors to the junction box.

Two different styles of the station junction box are used, one for low power stations and another for high power models, as shown in Figure 2 and Figure 3.

2.3 POWER SUPPLY

NOTE

The following section does not apply to the 300 W 900 MHz station. See manual referenced in Table 1 for details.

The station power supplies are mounted in the upper half of the cabinet behind the power amplifier decks (see Figure 4 and Figure 5) and are accessible when the power amplifier decks are tilted forward. The standard power supplies are ferro-resonant types designed to operate from a nominal 110 volt, single-phase, 60 Hz AC power source. They also provide transient protection against line surges and lightning. Options are available for other primary voltages and 50 Hz operation on selected models. One supply is installed in low power stations, and two supplies are installed in high power stations.

For VHF stations, the power supplies are each capable of delivering up to 675 watts. They operate with line voltages of 96 to 132 volts AC, and provide both a 14 volt DC and a 28 volt DC output. For UHF and 900 MHz stations, the power supplies are each capable of delivering up to 500 watts, with a single 13.8 volt DC output. They operate with line voltages of 96 to 132 volts AC on all 900 MHz and low power UHF models, and 103 to 127 volts AC on the high power UHF model.

2.4 RF TRAY

The RF tray is mounted on slides in the bottom half of the cabinet (refer to Figure 4, Figure 5, and Figure 7). Latches on the ends of the front panel secure the tray to the cabinet frame. The RF tray is a compartmentalized casting that contains and provides shielding for the station's low-level transmitter and power control circuitry.

The interconnect board, vertically mounted in a slot beneath the RF tray, provides connections between the RF tray and the power amplifier deck, power supply, and the Advanced Control Tray Backplane board. The interconnect board also contains a portion of the power control circuitry as well as a linear voltage regulator which supplies the RF tray with 5 volts dc. Original interconnect boards may not have the linear regulator. When retrofitting existing stations with the ACB, the PSLIB board will supply + 5V to the RF tray. Feedthrough plate assemblies mounted in the RF tray provide RF isolation between the interconnect board and circuits contained in the RF tray casting. Additional shielding and isolation is provided by covers and plates over critical circuit board areas and compartments by metal braid between compartments and by the RF tray cover.

The uniboard is the large board mounted solder side up inside the RF tray. It contains circuits for the PLL synthesizer and power control.

The low-level transmitter consists of the synthesizer and modulation circuits on the uniboard, the transmit VCO in the back right hand side of the RF tray, and the Intermediate Power Amplifier (IPA) located in the center rear of the RF tray. The low-level transmitter develops several watts of output power at the transmit frequency for amplification by the Power Amplifier (PA). Several points in the transmitter circuitry may be metered through a front panel jack on the RF tray.

The power control circuitry located on the uniboard receives inputs from the power amplifier decks and the ACB to control the keying and power output level of the station. It signals the ACB when the output power cannot be leveled to the desired power setting and protects the power amplifier by reducing the output power. The RF output power level is set via a potentiometer accessed through the front panel of the RF tray.

2.5 DRIVER POWER AMPLIFIER (DPA) AND FINAL POWER AMPLIFIER (FPA) DECKS

NOTE

The following section does not apply to the 300 W 900 MHz station. See manual referenced in Table 1 for details.

The transmitter power amplifier decks are mounted in the upper half of the cabinet and are accessible when the cabinet door is removed. The decks can be tilted outward (see Figure 5 and Figure 6) when screws securing it to the cabinet frame are removed. All PA deck connections (power and control) are made at the left end of the PA deck heat sink.

In high power models, the DPA is mounted directly above the FPA and consists of single or mult-connected transistor stages (amplifier modules). Low power models do not contain a DPA. Instead, one or more series connected amplifier modules contained within the FPA act as pre-drivers to the final amplifier stages. The FPA in both high and low models consists of several identical parallel connected amplifier modules. The FPA deck is designed such that should any one of the parallel connected final amplifier stages fail, the transmitter will continue to safely operate at a reduced power output. Both the DPA and FPA feature metering jacks which permit measurement of amplifier module current to facilitate servicing of the PA deck. The forward power output of the FPA deck is monitored by power control via a directional coupler.

2.6 TRANSMITTER PERIPHERALS

Several peripheral devices are used to improve transmitter performance and protection. A single circulator (standard on all models except VHF and 280 MHz), mounted beneath or internal to the FPA deck, provides protection for the FPA modules against transmitter intermodulation and antenna mismatch (see Figure 4, Figure 5, and Figure 6). A triple circulator is available for some models to provide better isolation and protection against intermodulation. An RF low-pass harmonic filter is provided with all stations.

2.7 HSO/UHSO PAGING SYNTHESIZER

The paging sythesizer is mounted on slides at the bottom of the station cabinet (see Figure 5). Latches at the sides of its front panel secure this tray to the cabinet frame. The left side of the synthesizer chassis contains the oscillator and its power supply. The right side of the chassis contains the circuitry to provide a 14.4 MHz reference signal to the uniboard transmit frequency determining sythesizer in

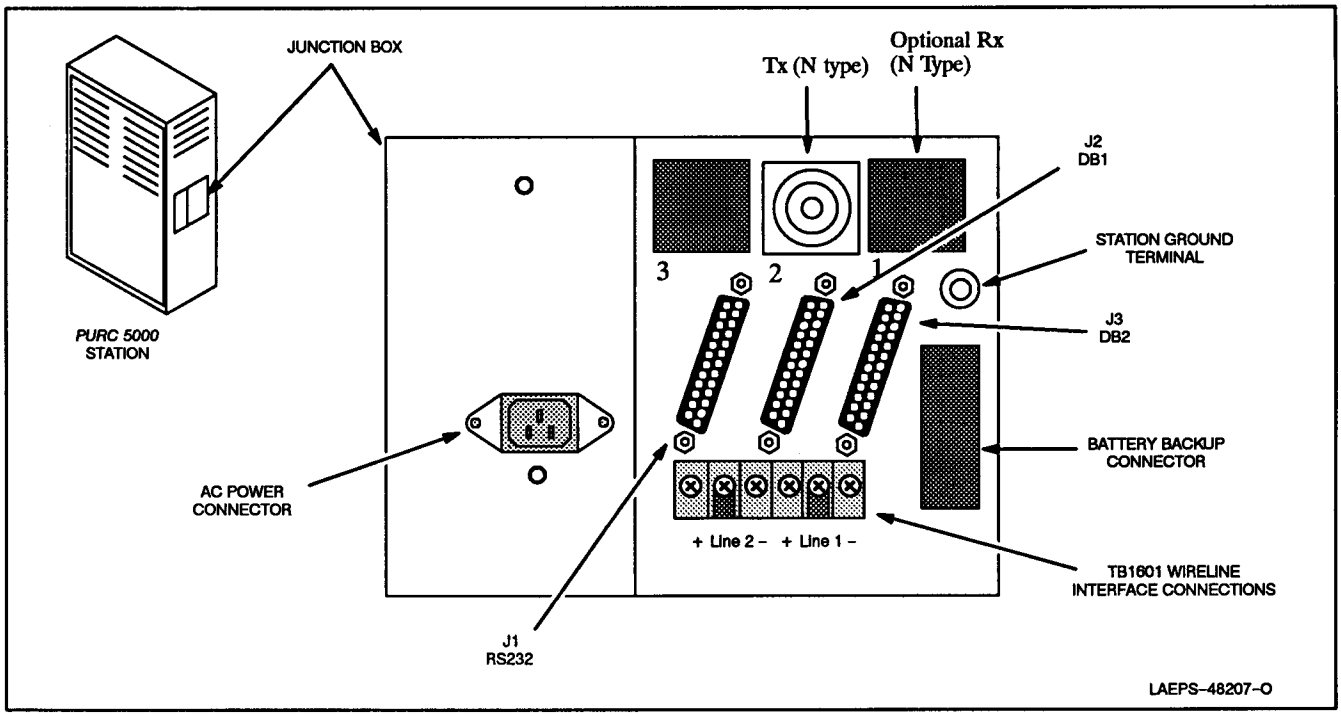


*Figure 2. Low Power **PURC 5000** Junction Box*

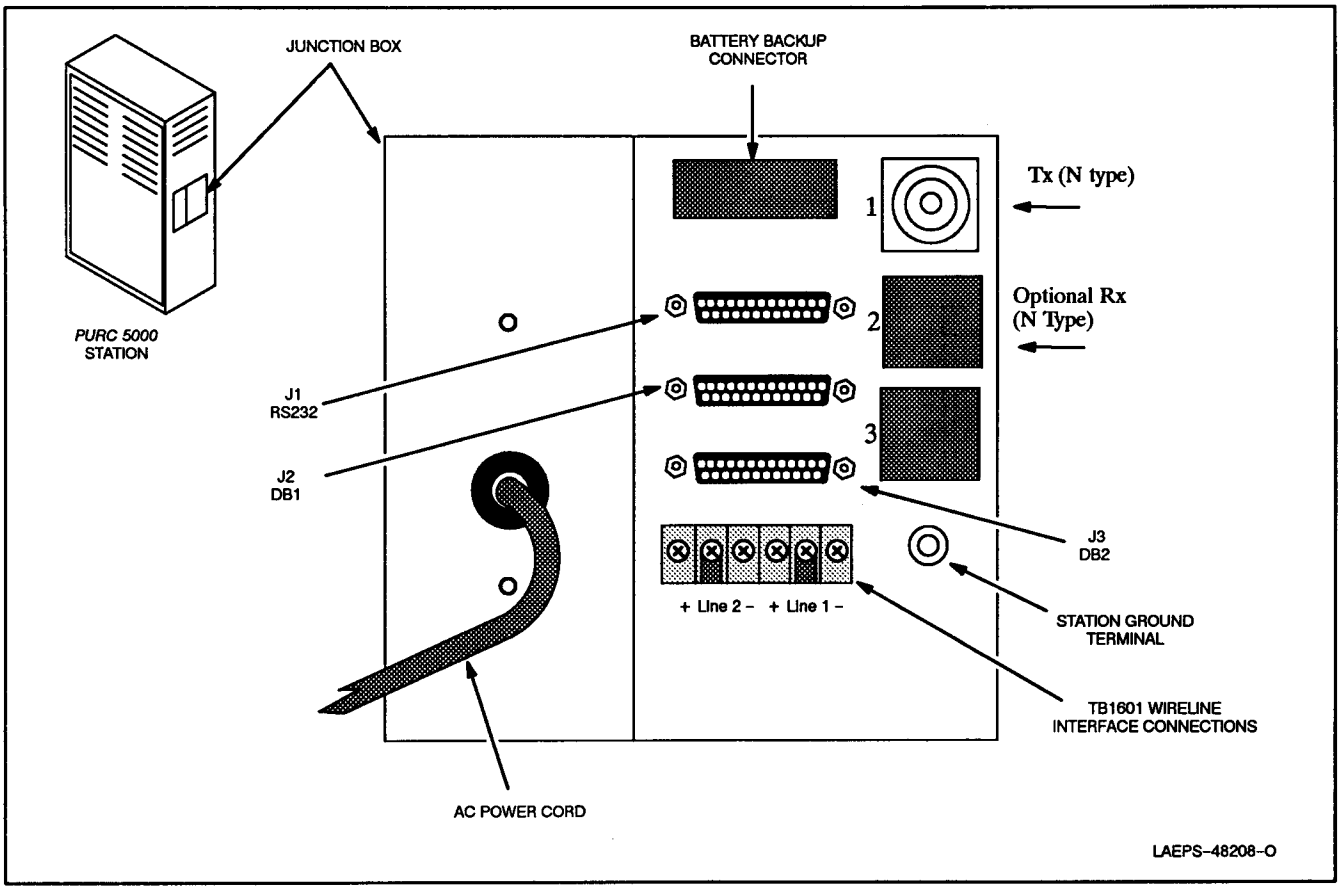


*Figure 3. High Power **PURC 5000** Junction Box*

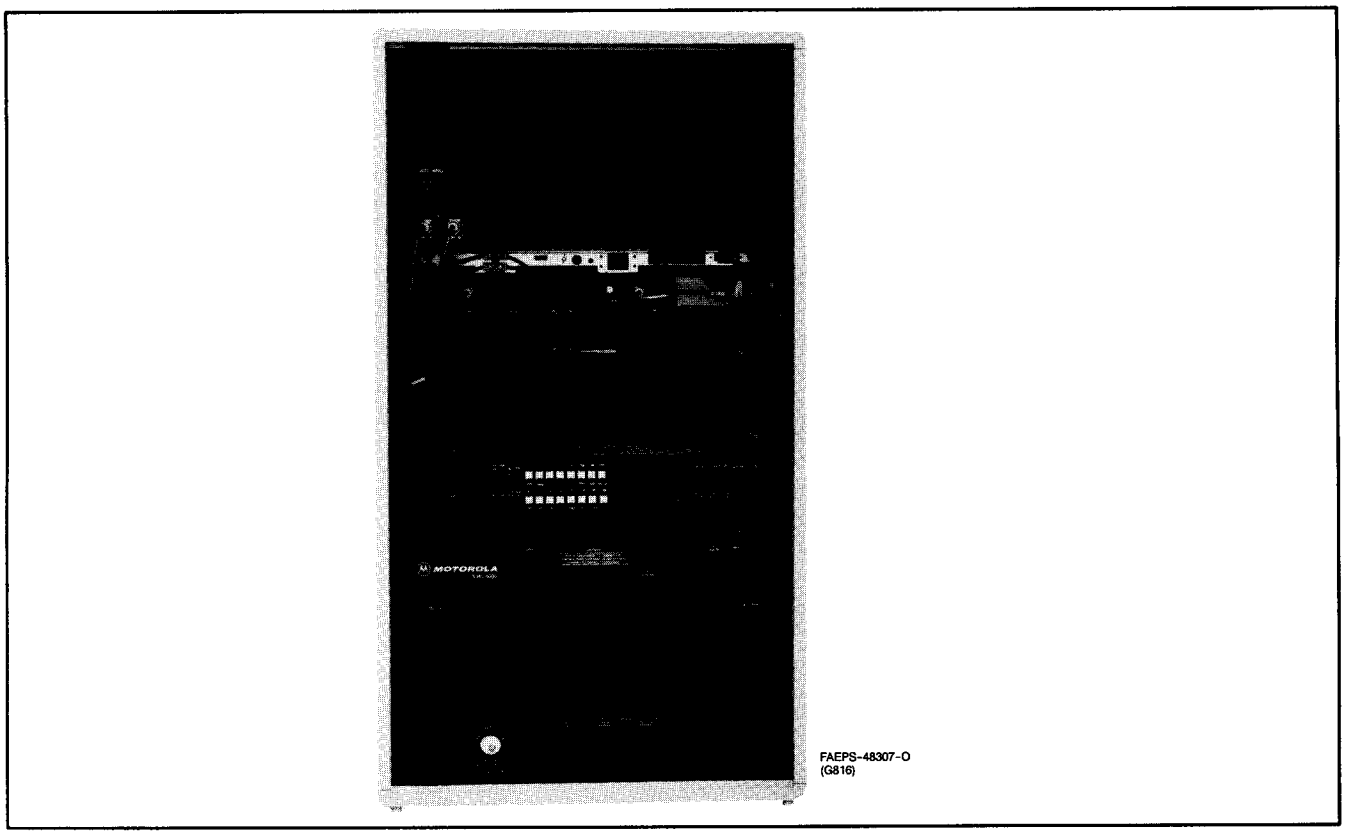


*Figure 4. Typical Low Power **PURC 5000** Station (Door Off)*

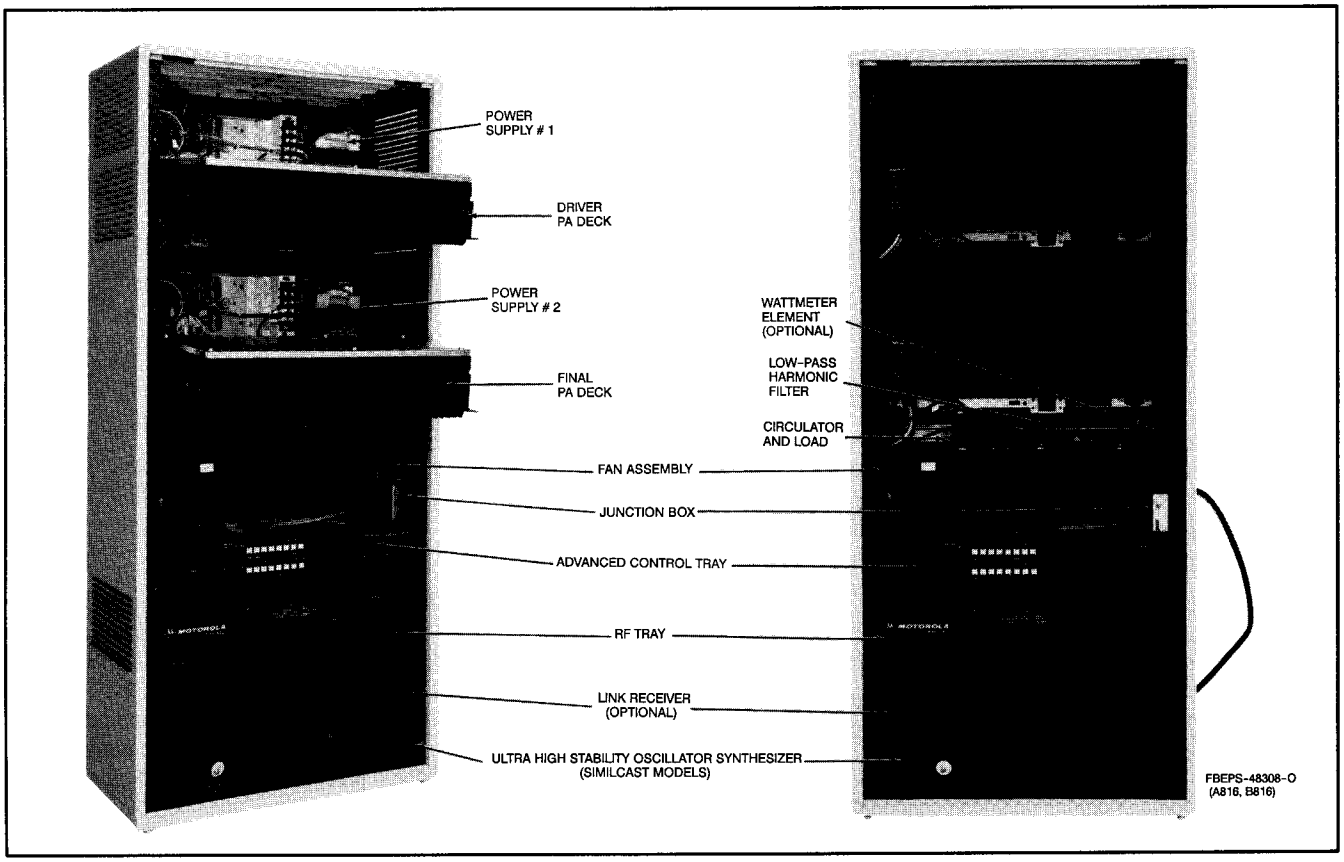


*Figure 5. Typical High Power **PURC 5000** Station (Door Off)*

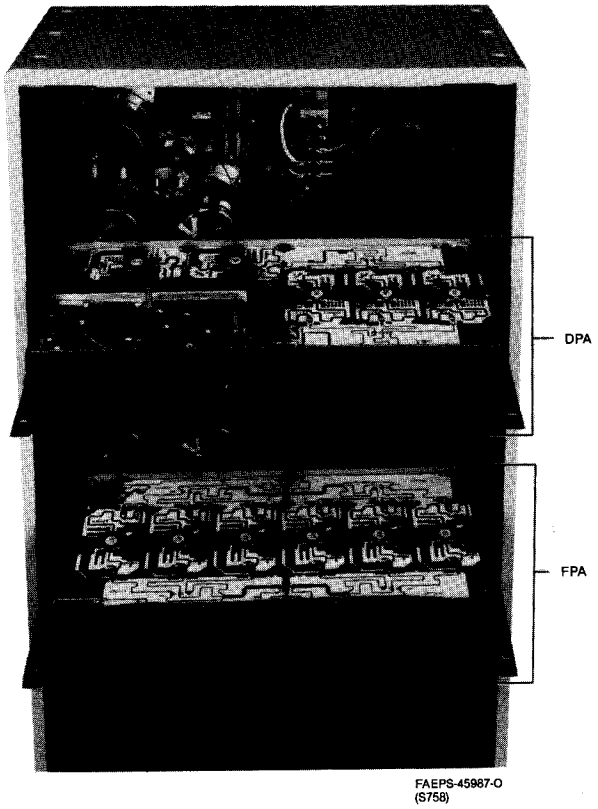


*Figure 6. Typical **PURC 5000** PA Deck (Internal View)*

the RF tray. Frequency stability for both the standard and optional oscillators is described in Table 3. A High Stability Oscillator (HSO) refers to a 30 ppb stability and an Ultra High Stability Oscillator (UHSO) refers to a 2 ppb stability.

Table 3. Oscillator Frequency Stability

Models	Standard Stability	Optional Stability
900 MHz	2 ppb	30 ppb
UHF	30 ppb	2 ppb
VHF	30 ppb	2 ppb
280 MHz	30 ppb	2 ppb

2.8 LINK RECEIVER (OPTIONAL)

The optional Link Receiver chassis is mounted on slides between the RF tray and the paging synthesizer. Latches at the sides of its front panel secure this tray to the cabinet frame. The chassis contains the receiver RF and I-F board, an audio board with a flat frequency response, and the circuitry required to interface to the control board. Refer to the Link Receiver Instruction Manual 68P81064E10 for further details.

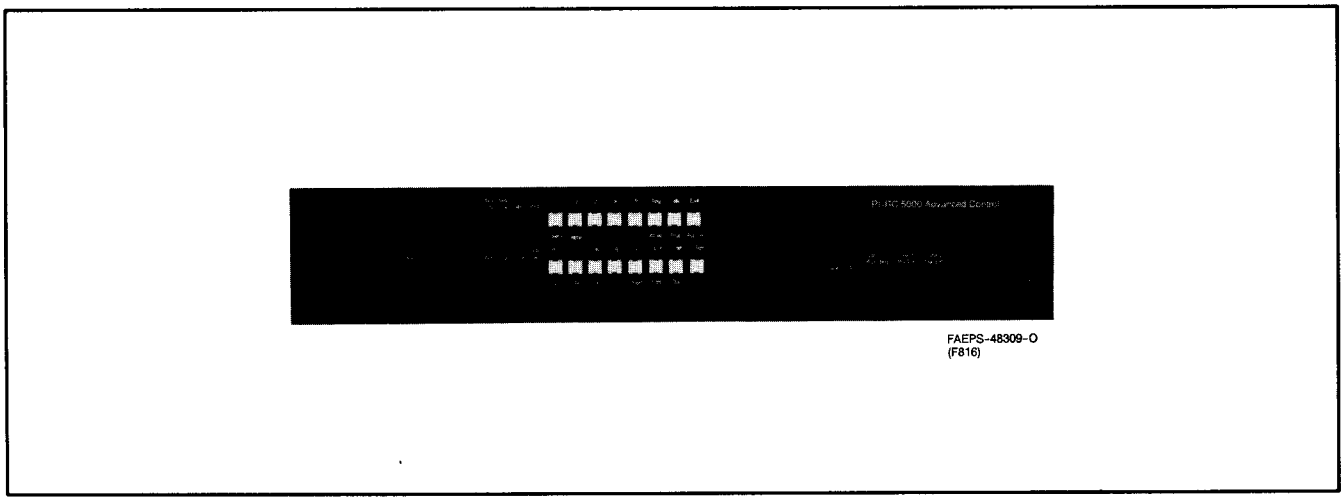


Figure 7. Advanced Control Tray

2.9 ADVANCED CONTROL TRAY

The Advanced Control Tray is mounted directly above the RF Tray and provides mounting space for the Advanced Control Board (ACB), the Power Supply Line Interface Board (PSLIB), and the Control Panel. The Backplane board is mounted to the back of the tray and provides the interconnections between the modules inside the tray and the station's other modules. The tray is mounted directly to the rails with 4 screws and does not slide out. The ACB and PSLIB slide into the tray using card guides and are secured via the edge connector on the back of the boards. The Control Panel is mounted to the front of the tray and is electrically connected to the ACB using a ribbon cable. If the cover must be removed, simply pull up on the sides of the tray and pull the cover out from the station. To replace the cover, fit the slots of the tray cover into those on the back of the tray and push the cover down onto the tray.

A 40-conductor expansion tray connector (J1450) located at the top left side of the Backplane board provides electrical access to the optional expansion tray. This connector also provides an interface for the Diagnostic Metering Panel (DMP) or Radio Metering Panel (RMP). Currently, the MUXbus is not supported by the *ACB*. The DMP and RMP can used to monitor speaker audio and for PA and RF tray metering. Speaker volume can be adjusted to one of four levels as programmed by the Service Mode / Speaker Volume menu. See section 5.9.7.2 for details.

2.9.1 Advanced Control Board

The ACB controls station operation based on station status information. The ACB processes all station transmit and received audio. The station's operating parameters are stored in EEPROM and can be changed via the Control Panel.

The ACB uses the Motorola MC68HC11 microprocessor to control the Motorola DSP56001 Digital Signal Processor. The board also contains two I/O ASICs used to provide station logic functions and microprocessor support. A third custom ASIC is used to provide two serial ports and chip select line hardware. This ASIC is also used to support the Delay features, the Remote Frequency Adjust feature, DSP Codec control, and a tone generator for MDC tone encoding.

2.9.2 Control Panel

The Control Panel provides the means of programming/changing the station's parameters and functions. It consist of an 8 digit alpha numeric display, a 16 push button keypad, and 9 LED indicators. A complete description of programming functionality can be found in paragraph 5.

2.9.3 Power Supply Line Interface Board

The PSLIB uses a 200 KHz DC to DC converter to generate +5 V from A+. The PSLIB also buffers and filters 9.6 V from the IPA. The board provides an interface for wireline connections and user jacks for station alignment and testing. Furthermore, the board provides space and power connections for an optional internal Hayes compatible modem. The board also has provisions to provide battery back-up power and battery charging for the internal modem.

2.9.4 Backplane Board

The Backplane board provides the interface between the Advanced Control modules and the station modules. This board contains no active components.

3. STATION OPTIONS

Table 4 identifies the options available for the *PURC 5000* Stations. Not all options are available on all models. For specific model availability, contact sales. Depending on system usage, some options may require additional hardware and system setup that is not provided by the option.

Table 4. PURC Station Options

OPTION	Description	Described in this manual
C17	Antenna Relay	No
C47	Digital Wattmeter	Yes
C199	Redundancy	Yes
C664	Monitor Receiver	No
C770	Digital Delay Line	Yes
C775	Key on Data	Yes
C791	DRC	Yes
C659	UHF Link Receiver-CS	No
C660	900 MHz Link Receiver-CS	No
C661	Mid Band Link Receiver-DPL	No
C662	UHF Link Receiver-DPL	No
C663	900 MHz Link Receiver-DPL	No
C850	Mid Band Receiver-CS	No
C696	12.5 KHz Channel Receiver	No
C28	60 Hz Battery Charger	No
C32	DC Only Operation	No
C257	50 Hz 110/220 Volts Pwr Supply	No
C681	60 Hz 110/220 Volts Pwr Supply	No
C149	Radio Metering Panel	No
C306	HSO	No
C777	UHSO	No
C265	Single Circulator	No
C676	Triple Circulator	No
C362	Special Packing Kit	No
C859	Omit Service Manual	No
C52	37" Universal Rail Cabinet	No
C40	46" Universal Rail Cabinet	No
C308	46" COMPA Cabinet - 14" Deep	No
C195	46" COMPA Cabinet - 20" Deep	No
C27	46" Outdoor COMPA Cabinet	No
C180	60" COMPA Cabinet	No
C307	70" Indoor COMPA Cabinet	No
C164	Rack Mount	No

4. STATION OPERATION

This section describes the front panel controls and indicators, control panel operation, and a description of the extensive station parameters and functions.

The controls and indicators associated with the Advanced Control tray are shown at the end of this section. Refer to the Advanced Control Tray Control Panel Menus pull-out page at the end of this section when performing the adjustments required during installation, or when servicing the station.

4.1 LED INDICATORS

There are nine LEDs on the control panel to indicate the stations current operating conditions and two LEDs on the PSLIB to indicate board power. A green LED indicates that the station is working properly. A yellow LED is a status indicator. A red LED is a warning that either the station has a problem or the station is operating in a special mode and should not be left unattended while in that mode. The following is a list of the LEDs and how they are defined.

4.1.1 Control Panel Indicators

Disable: This red LED indicates that the station is disabled from normal operation. The LED will light due to the following conditions: Redundancy Disable, Disable keyup upon High VSWR Alarm, Delta Delay Detect Alarm, Front Panel Access Disable, any Alignment Mode, Service Modes that affect paging operation, Remote Access Disable, Rx PL Disable, Entering a bad Frequency, and No Tx Loop from RF tray. A front panel Access Disable will inhibit all remote key attempts for paging or diagnostics. A remote disable from the controller will also inhibit the radio from paging even though diagnostic key-ups are allowed.

Mdc Rx: This yellow LED indicates when the station is receiving an MDC message. It flashes once when a message is detected.

Mdc Tx: This yellow LED indicates when the station is transmitting an MDC message.

Bin (Binary): This yellow LED indicates when the station is keyed in Binary mode.

PTT: This yellow LED indicates that the station has a key request.

Alm (Alarm): This red LED indicates that the station has an active alarm. To check which alarm is active, select the **Alm** key on the display and check each sub-menu for active alarms. See paragraph 5.10 for further details on using the display menu.

Tx Lck (Tx LOCK): This green LED indicates that the RF tray and the paging synthesizer are locked on frequency.

PA Ful: This green LED indicates that the PA has full power when the station is keyed.

PA On: This green LED indicates that the PA is active.

4.1.2 PSLIB Indicators

A+: This green LED indicates that 13.8 volts is being applied.

5V: This LED indicates that the PSLIB is generating 5 volts.

4.2 POWER RESET

To perform a power reset on the station, depress the RST key on the lower right of the Control Panel. This will cause the station to go through power-up diagnostics and reset all RAM values. The Alarm LED will light to indicate a RESET occurred. To clear this alarm, enter the Alarm menu and go to Station Alarms and clear the RESET alarm. Refer to paragraph 5.10 for more details on clearing alarms. See paragraph 4.5.1 for further details on power-up diagnostics.

4.3 ACCESS DISABLE

The **AccDs** (Access Disable) key, is used to disable the station from remote keyup request while allowing the station to key locally. If access disabled, the **Disable** LED will light and the station will be disabled from remote keying and diagnostics.

4.4 PSLIB SIGNAL PORTS

A three conductor (Tip, Ring, and Ground), Motorola part number 3083902P01, phone plug is used to access all signal ports. The remaining paragraphs will refer to it as a phone plug.

4.4.1 Line 1 Bridge

The insertion of a phone plug into the **Brg** jack allows for monitoring of Line 1 input audio from the J-box to the transmitter with a high impedance metering device.

4.4.2 User Audio

The insertion of the phone plug into the **Usr Aud** jack allows for monitoring ACB test points via the Service Mode\User Audio menu. Reference the station service manual for hardware details. The following test points can be monitored:

TP4: Input audio
TP5: Gained audio
TP6: DSP Input Audio
TP7: Exciter Audio
TP8: Rx Audio
TP9: Line 2 Audio

4.4.3 Line 1 Line

Plugging the phone plug into the **Lin** jack allows for monitoring external J-box Line 1 600 ohm audio. The audio is interrupted to the station whenever the plug is inserted.

4.4.4 Line 1 Station

Plugging the phone plug into the **Lin 1 Sta** jack causes the external J-box Line 1 audio to be interrupted. Local 600 ohm audio can now be sourced to the station through the phone plug.

4.4.5 Line 2 Line

Plugging the phone plug into the **Line 2 Lin** jack interrupts station Line 2 audio to the external line at the J-box Line 2 interface. The phone plug is now connected to the external Line 2 connection at the J-box. Local audio can now be sourced to the external wireline.

4.4.6 Line 2 Station

Plugging the phone plug into the **Line 2 Sta** jack disconnects the external J-box Line 2 interface from the station 600 ohm balanced line driver transformer circuitry. Station 600 ohm line 2 audio can now be monitored using the phone plug.

4.5 STATION DIAGNOSTICS

4.5.1 Power-up/Reset Description

Upon station power-up or reset, a variety of diagnostic tests are performed to verify both that the hardware is functional and that the firmware devices are correctly programmed. The hardware diagnostic tests encompass both digital and audio tests, and are designed to detect a

faulty device or group of components. In some instances, the faulty circuit within a component can be identified. The faulty components are indicated to the user via the Status Display and the LEDs on the control panel. Furthermore, an error that occurs during either sequence will be displayed on the control panel display. A listing of the error codes and their descriptions can be found in Table 5.

4.5.2 Unsolicited Alarm Reporting

This feature allows the station to report alarms back to the controller via Line 2 or RS232. It reports the last value for forward and reflected power and alarm status bits indicating Major and Minor alarms. It is then up to the controller to interrogate the station for specific alarm conditions. Refer to Station Configuration section 68P81085E81 for information on setting up this feature.

4.5.3 Error Log Description

The Error Log is a feature that can only be utilized via an ASC using either MDC DRC II or the RS232 communications port. The Error Log contains up to 256 accessible entries of error code information.

5. CHANGING STATION PARAMETERS

The 16 push button keypad allows the user to check the status and change various station parameters and functions. The parameters and functions are divided into 12 sections and each is represented by a keypad button. (Refer to the pull-out page at the end of this section for a diagram of the control panel, and Parameter and Function menus.)

To gain password access to the front panel, depress any key. If the validation feature is disabled, the display will read READY after the key is depressed. If enabled, the display will read READY ENTER PASSWORD, then the password must be entered. The password is represented by a number from 0-9999. Any number of digits may be entered up to a maximum of 4. The default password is 5000. Once access has been gained, the password can then be changed to any number in the range via a menu selection.

WARNING

If the password is forgotten, then access to the control panel prohibited. However, the ASC can read the value of the password for users trying to gain access. If an ASC is not available, a change of the microprocessor and reprogramming of default values is required.

If a key has not been depressed for 5 minutes the display will go blank. Depressing any key will activate the display. The display will once again read either READY or READY ENTER PASSWORD, and the user will have to gain access again before the control panel is useable.

In order to select a menu, the appropriate key must be depressed. Once the menu has been selected, the menu title will appear on the display. If the title is 9 characters or more, it will be scrolled across the display. Next, use the up/down arrows to get to the desired sub-menu entries. After each depression of the up/down keys, the display will be refreshed to show the current entry. If the entry is at the lowest level (i.e., it is not a sub-menu title) then the value/status of that entry will be displayed immediately after the entry description. To select the entry that is a sub entry title, depress the **Ent** (enter) key. The first selection of the sub-menu will appear. Once again, use the up/down arrows to find an entry in the menu.

To change an entry value, depress the **Ent** key. The value will begin flashing. The value can be either entered as a number using the keypad or by using the **Tog** (toggle) key to scroll though the choices. Once the value is keyed in, press the **Ent** key to store the value. If the **Ent** key is not pressed before the **Exit** key is pressed, the previous value remains as the value stored for that entry. As a reminder, an entry value can only be changed when it is at the lowest menu level. To exit back one level, press the **Exit** key.

The following paragraphs describe each parameter and function. Specific information regarding invoking/setting-up the parameters and functions is discussed in Station Configuration section 68P81085E81. Some values are status only and therefore cannot be changed. Others can only be changed if the station has the appropriate option. Furthermore, some values will not be implemented on software versions 1.1,1.2,1.3,...1.9 but will be described in this manual. Those items will be marked with an asterisk (*) and will not be displayed.

NOTE

The modification of any parameter stored in non-volatile memory (EEPROM) will cause a "EE Data Modified" alarm. See paragraph 5.10 for details.

5.1 STATION PARAMETERS

The parameters under this heading involve the make-up of the station's capabilities. See Station Configuration section 68P81085E81 for specific details on station set-up.

5.1.1 *Base Station/Link Tx

This entry allows the user to change the station operation from a base station to a Link Transmitter. The selection is changed via the **Tog** (toggle) key.

5.1.2 Frequency Range

This entry displays the frequency range of the station. Unless installing a new ACB, this range should not be changed. The frequency range is not based on the Advanced Control Board but is determined by the paging synthesizer tray, the RF tray, and the PA. Refer to Table 1 in Station Configuration section 68P81085E81 for a listing of the valid frequency ranges. This value is changed via the **Tog** (toggle) key.

5.1.3 Frequency Range Checking

This entry allows the user to enter frequencies outside of the defined frequency ranges. Under normal operation the Frequency Range Checking field is always enabled, and should only be disabled for special purposes. The field can be enabled or disabled via the **Tog** (toggle) key.

5.1.4 Station ID

This entry allows the user to check the station's Individual ID in the system. If the system is controlled by an ASC, it is suggested that this value not be changed via the control panel after initial installation. The value is changed by entering a number value in the range of 0–1023.

5.1.5 DRC Setup

This sub–menu allows the user to set–up the station as a DRC station. These parameters apply only to those stations with the DRC Option or an equivalent upgrade.

5.1.5.1 *DRC/TRC Mode

This entry allows the user to choose the DRC mode. The station must be equipped with the DRC option or upgrade in order for the entry to change. The value is changed via the **Tog** key.

5.1.5.2 DRC System ID

This entry allows the user to check the System ID of the station. If the system is controlled by an ASC it is suggested that this value not be changed via the front panel after initial station setup. The value is changed by entering a number value in the range 0–15.

5.1.5.3 Polled Response

This entry allows the user to select the method of transmission for the return path of polled/diagnostic messages. The messages can be sent out via Line 2 or RF. The value is changed via the **Tog** key.

5.1.6 Drop Out Delay

This entry allows the user to select the Drop Out Delay of the station. Drop Out Delay is the amount of time the station will remain keyed after paging or control information has ended. The default for a DRC station is 6 seconds. The value is changed via the **Tog** key.

5.1.7 Time–out Timer

This entry allows the user to change the maximum time the station can remain keyed. The default value is disabled and can be changed via the **Tog** key.

5.1.8 System Timer

This entry allows the user to program a timer to ensure that the station has not been idle for the set amount of time. If the timer should expire, an alarm will be set. The default value is disabled and can be changed via the **Tog** key.

5.1.9 Password

This entry displays the current password value. The value can be changed using the keypad numbers. Any value from 0–9999 can be entered.

WARNING

After changing the password, read the value back to verify password before the display times out. Remember, once entered, this is the new password for gaining access to the front panel.

5.1.10 *TRC Tone Table Selection

This entry allows the user to select a specific function tone decode table. This menu will only be applicable if the station is in the TRC mode. The field is changed via the **Tog** key.

5.1.11 *Guard Tone Frequency

This entry allows the user to change the guard tone frequency among several predefined choices. The value selected will be used for both HLGT/LLGT detection, as well as the transmit audio path notch filter. The field is changed via the **Tog** key.

5.1.12 Current Channel

This entry allows the user to set/view the current channel. The value is a toggle (**Tog**) entry.

5.1.13 Front Panel Password Feature

This entry will allow the user to either enable or disable the control panel validation feature. The value is changed via the **Tog** key.

5.1.14 Wattmeter Element

This entry allows the user to check which wattmeter element is in the station. It can be changed via the **Tog** key, but should only be changed if the station is being retrofitted with the Wattmeter Option or the ACB is being replaced. Refer to Station Configuration section 68P81085E81 for a full description of element types.

5.1.15 *Serial Number

This entry displays the station's serial number. This value must be reprogrammed if the ACB is replaced. The value is a 10 character alpha numeric code.

5.1.16 *PURC/PURC 5000*

This entry allows the user to check/set the type of base station. The value is changed via the **Tog** key.

5.2 RECEIVE AUDIO

These entries describe the setup of the station's input audio.

5.2.1 Delay Function

This entry enables or disables the built in propagation delay. If enabled, it allows a delay value to be added to the incoming audio signal. The amount of delay added is programmed as the delay value. The field can be changed via the **Tog** key.

5.2.2 Delay Value

This entry allows the user to enter a delay value. The value range is from 0–262143 μs. The decimal point is in a fixed position and the value must be entered in μs but is displayed in ms. For example, the maximum value would be entered as 262143 and the display would show 262.143 ms. The value 1 ms would be entered as 1000 and the display would show 1.000 ms. The value is entered via the keypad numbers. The decimal point is not entered.

5.2.3 Gain Function

This entry will either enable or disable the gain function. If enabled, it allows a gain value to be added to the incoming audio signal. The field is changed via the **Tog** key.

5.2.4 Gain Value

This entry allows the user to enter a gain value. The gain value range is from –10 dB to + 10 dB in 0.1 dB steps. To enter a number, first enter the number value in tenths of a dB, then use the **Tog** key to change the sign value. Only a negative sign value appears on the display. No sign will appear for a positive value. For example, 10 dB would be entered as 100 and displayed as 10.0 dB. It is suggested that this value only be changed via the controller.

5.2.5 Input Audio Source

This entry allows the user to select a source for input audio. The choices are Line (Wireline), Link (Link Receiver), or Auxiliary. The value is selected via the **Tog** key.

5.2.6 * AGC Function

The Automatic Gain Control (AGC) feature can be enabled or disabled. If enabled, the station will adjust the gain to compensate for input level variations based on HLGT/MDC. The value is changed via the **Tog** key.

5.2.7 Buffered Audio Output Function

This entry will either enable or disable the gating of the input audio to an external device. The value is changed via the **Tog** key.

5.2.8 Line 2 Audio Source

NOTE

This has no impact on selection of DRC Setup\Polled Response as described in paragraph 5.1.5.3.

This entry allows either receiver audio, aux audio or no audio to be routed to the line 2 driver circuitry. The value is changed via the **Tog** key.

5.2.9 Line 2 Audio Type

This entry allows audio selected for line 2 to be either de-emphasized (6 dB per octave) or flat. The value is changed via the **Tog** key.

5.2.10 Rx DPL/PL Function

This entry will allow the user to either enable or disable the Receiver DPL/PL function. The value is changed via the **Tog** key.

5.3 TRANSMIT

These entries describe the setup of the transmitter.

5.3.1 Remote Frequency Adjust Function

The frequency adjust function can be either enabled or disabled. This entry allows a controller to remotely adjust the station's transmit carrier frequency by warping its reference oscillator. The value is changed via the **Tog** key.

5.3.2 Remote Frequency Adjust Value

This entry allows the user to change the frequency offset value. The value is changed by entering a number value in the range of –49 to + 50 in 1 step increments. To enter a number, first enter the number value, then use the **Tog** key to change the sign value. Only a negative sign value appears on the display. No sign will appear for a positive value. It is suggested that this value only be changed via the controller.

5.3.3 Channel Frequencies

This entry allows the user to change the frequencies of the 32 channels of the radio. To change the value, the number keys are used to enter in a frequency. The decimal point is in a fixed position and the value must be entered in Hz but is displayed in MHz. See Station Configuration section 68P81085E81 for information on setup frequencies.

5.3.4 Tx Deviation Setup

The 3 entries under this sub–menu title are accessed by depressing the **Ent** (enter) key. The first entry will be displayed. Refer to Station Alignment section 68P81085E82 for details on deviation setup.

5.3.4.1 Maximum Deviation

This entry contains the maximum analog Tx deviation value for the station. All analog transmissions will be limited to these levels. The value ranges from 0 – 7000 Hz in 1 Hz increments. The value is changed by entering in a number via the number keys.

5.3.4.2 Nominal Deviation

This entry contains the nominal analog Tx deviation for the station. The value ranges from 0 – 7000 Hz in 1 Hz increments. The value is changed by entering in a number via the number keys.

5.3.4.3 Nominal Binary Deviation

This entry contains the binary Tx deviation value for the station. The value ranges from 0 – 7000 Hz in 1 Hz increments. The value is changed by entering in a number via the number keys.

5.3.5 * Tx DPL/PL Setup

The 3 entries under this sub–menu title are accessed by depressing the **Ent** (enter) key. The first entry will be displayed.

5.3.5.1 Tx PL/DPL Function

This entry allows the user to enable or disable the Tx PL/DPL function. The value is changed via the **Tog** key.

5.3.5.2 Tx PL Frequency

This entry contains the value of the Link Transmitter PL Frequency. The valid frequencies range from 67.0 Hz to 255.0 Hz. The value is changed by entering in a number via the number keys.

5.3.5.3 DPL Code

This entry contains the value of the Link Transmitter DPL Code. The valid code range is from 0–777. The value is changed by entering in a number via the number keys.

5.3.6 Flat/Pre–Emphasis

This entry allows the user to change the transmit audio response from the default flat response to a 6 dB per octave pre–emphasis response. The field is changed via the **Tog** key.

5.3.7 Guard Tone Notch Function

This entry allows the user to enable or disable the transmit audio path notch filter. The field is changed via the **Tog** key.

5.3.8 Special Tx Setup

The 3 entries under this sub–menu title are accessed by depressing the **Ent** (enter) key. The first entry will be displayed.

5.3.8.1 Audio Phase Inversion Function

This entry allows the user to enable or disable a 180 degree audio phase inversion of the input audio. The value is changed via the **Tog** key.

5.3.8.2 Binary Tx Data Inversion Function

This entry allows the user to enable or disable a logic inversion of the data before it's transmitted. The value is changed via the **Tog** key.

5.3.8.3 T=R Function

This entry allows the user to set up the radio when a co–located receiver is desensed by the paging transmitter. Enabling T=R shifts the Tx frequency when the station is not keyed. The feature is enabled or disabled via the **Tog** key.

5.4 OPTION 1 – STATION OPTIONS

These entries are applicable to optional station configurations.

5.4.1 Antenna Relay Function

This entry allows the antenna relay function to be enabled or disabled. The value is changed via the **Tog** key.

5.4.2 * Auto ID Setup

These entries setup the Auto ID feature. If enabled the station will key and send out an ID on a given channel and time interval. To get down to the sub-menus, depress the **Ent** (enter) key and use the up/down arrows to get to the choices.

5.4.2.1 Auto ID Function

This entry allows the user to either enable or disable the Audio ID feature. The value is changed via the **Tog** key.

5.4.2.2 ID Interval

This entry allows the user to select the time interval in which the ID will be sent out. The values are selected using the **Tog** key.

5.4.2.3 ID on Channel

This entry allows the user to select which channel the ID is to be sent out on. The channel is selected using the **Tog** key.

5.4.2.4 Auto ID

This entry displays and sets the Auto ID value.

5.4.3 Special Key Setup

This entry allows the user to select if the station is to keyup on a special request other than a TRC or DRC command. The value is changed via the **Tog** key. The choices are:
Special Keyup Disabled (default)
Key on Internal Carrier Detect
Key on External Carrier Detect
Key on Fast Key Request Active Low
Key on Fast Key Request Active High
External Key Request Active Low
External Key Request Active High

5.4.4 Delta Delay Setup

These entries allow for the setup of the Delta Delay Detect (DDD) feature. This feature requires the DRC option to be present. The feature detects the change in the control path's delay and compares the value to the threshold value. If the value exceeds the threshold value the DDD alarm is set active.

5.4.4.1 Delta Delay Function

This entry allows the user to enable or disable the Delta Delay Detect feature. The value is changed via the **Tog** key.

5.4.4.2 Delay Threshold

This entry contains the DDD alarm trip point value. If the control path delay changes and is greater than the trip point, an alarm is set. The threshold value is programmable from 25 µs to 6.375 ms in 25 µs increments. The value is changed by entering in a number via the numeric keys

5.4.4.3 Key-up Function if Alarm

This entry determines if the station will key if a DDD alarm is set. If enabled and the station has a DDD alarm, the station will be prevented from an RF key until the DDD is reset by the controller. The value is changed via the **Tog** key.

5.4.5 Frequency Measurement Setup

These entries allow the setup of the frequency measurement feature. The feature allows monitoring of the station's UHSO stability.

5.4.5.1 Frequency Measurement Function

This entry allows the user to enable or disable the frequency measurement feature. If enabled, the station will automatically measure the frequency and determine if the value measured exceeds the programmed value. The value is changed via the **Tog** key.

5.4.5.2 Frequency Drift Threshold

This entry contains the UHSO Drift Alarm trip point value. If the auto frequency measurement exceeds this value then the alarm is set. The value is programmable from 5 ppb to 327.675 ppm in 5 ppb increments. The value is changed by entering a number via the numeric keys.

5.4.5.3 Intentional Frequency Offset

This entry allows for the use of an intentional offset to be added to the carrier frequency when using the frequency measurement feature. The ACB will take this offset value into account when determining a frequency drift alarm. The value is programmable from 5 ppb to 163.835 ppm in 5 ppb increments. To enter a number, first enter the number value, then use the **Tog** key to change the sign value. Only a negative sign value appears on the display. No sign will appear for a positive value. It is suggested that this value only be changed via the controller.

5.4.6 Wildcard 1-8 Inputs

These entries allow the user to select the signal level, either Active High or Active Low, of the incoming wild

card lines. An active signal indicates a wildcard alarm. The value is changed via the **Tog** key.

5.4.7 Wildcard 1-8 Outputs

These entries allow the user to select whether the output signal is Active or Inactive. When a bit is active, then the corresponding open collector is Low (on). The value is changed via the **Tog** key.

5.4.8 Monitor Receiver Setup

5.4.8.1 Receiver Feature

This entry allows the user to either enable or disable (mute) an internal or co-located monitor receiver. This feature is normally controlled by an ASC for Simulcast systems. The value is changed via the **Tog** key.

5.4.8.2 Receiver Location

This entry is used to specify whether the receiver is located internal or external to the station. When external is selected, a discrete line is used to mute the co-located receiver. The value is changed via the **Tog** key.

5.4.9 Redundancy Setup

These entries allow for the setup of the redundancy feature. This feature is an option to the station. If the station does not have this option, this section can be skipped. For specific information on setting up this feature, refer to Station Configuration section 68P81085E81.

5.4.9.1 Redundancy Feature

This entry allows the redundancy feature to be enabled or disabled. If enabled, the station will operate according to the setup specified here, and those specified in the *PURC* LAN Setup, paragraph 5.5.3. The value is changed via the **Tog** key.

5.4.9.2 Master Station Setup

NUMBER OF STATIONS IN SYSTEM: This entry specifies how many Slave stations are in the Redundant system. To change this value, enter in a number via the keypad.

PRIORITIZATION FEATURE: This entry is used to determine if the station's position on the *PURC* LAN should be considered when determining switchover priority. If this feature is enabled, the LAN position will be used as a basis for switchover priority. Otherwise, position is not used as a basis for switchover. The default setting is enabled. To change the value use the **Tog** key.

KEYUP UPON SWITCHOVER FEATURE: This entry is used to determine whether the Master station is allowed to keyup after it has switched into the system for another station. If enabled, the Master station will be allowed to keyup immediately after switchover. Otherwise the Master will be prevented from an RF key until the controller resets the Delta Delay Detect. The default setting is enabled. To change the value use the **Tog** key.

FORCE SWITCHOVER: This entry is used to force a switchover from the control panel. The Master station will switch to the ID entered. To switch the station back in, and the Master out of the system, enter the Master station's Station ID here. To enter the ID use the numeric keypad.

5.4.10 External Paging Data Setup

Refer to Station Configuration section 68P81085E81 for details on setup.

5.4.10.1 Delay Path

The delay path field allows for the delay of external paging data. Either the input audio path or the external paging data paths may be selected via the **Tog** key.

5.4.10.2 Binary Data Source

The source of binary paging data, internal modem, or external source, is specified by this field. The field is changed via the **Tog** key.

5.4.10.3 Receiver Data Source

The data source field selects the source of external data, RS232 port, or external paging modem port. The field is changed via the **Tog** key.

5.4.11 PA Shutdown On High VSWR

This entry will allow the user to select whether or not the station will key when a High VSWR Alarm is active. The value is changed via the **Tog** key.

5.4.12 Unsolicited Alarm Reporting

These entries will allow the user to set up the unsolicited alarm reporting feature. This feature allows the station to either dial out or send a message down line 2 to the controller to report a problem that the station detects.

5.4.12.1 Unsolicited Alarm Feature

This entry allows the feature to be enabled or disabled. To change the value use the **Tog** key.

5.4.12.2 Report via Line 2 or RS232

This entry is used to determine how the unsolicited message is to be reported by the station. The message will

go out on Line 2 or dial-out via a modem and wait for connection. To change the value use the **Tog** key

5.4.12.3 *Report via DRC Mode or ASCII Mode

This entry allows the unsolicited message to be sent in either the DRC format or an ASCII message format. To change the value use the **Tog** key.

5.5 OPTION 2 - COMMUNICATIONS OPTIONS

5.5.1 RS232 Dial-In Setup

These entries allow for the setup of the RS232 dial-in parameters.

5.5.1.1 Dial-In Feature

This entry allows the user to enable or disable the dial-in port. To change the value use the **Tog** key.

5.5.1.2 Alarm on Invalid Attempts

This entry will permit an alarm after the number of invalid login attempts exceeds the number programmed. The value can be changed via the **Tog** key.

5.5.1.3 Action Upon Invalid Attempt Alarm

This entry determines the action taken when an alarm is set due to invalid logins. The choices are to disconnect, disconnect and dial-out, disconnect and disable dial-in, or to take no action. The value can be changed via the **Tog** key.

5.5.1.4 Auto Baud Detect Feature

This entry allows auto baud detection during dial-in. If enabled, the station will detect the incoming baud rate and switch the station to the same rate for the particular transmission. Upon disconnect, the station will revert back to programmed rate. If disabled, the station will use the programmed baud rate. The value can be changed via the **Tog** key.

5.5.1.5 Baud Rate

This entry allows the user to select the baud rate that the modem will use during dial-in and dial-out when the Auto Baud Detect is disabled. The value can be changed via the **Tog** key.

5.5.1.6 Smart Modem Feature

This entry determines whether the modem is a smart modem (Hayes), or a standard modem/no modem attached to the RS232 port. The value can be changed via the **Tog** key.

5.5.2 RS232 Dial-Out Setup

5.5.2.1 Dial-Out Phone Number

This entry is used to program the phone number used for unsolicited alarm reporting. The number value can be from 1 to 18 digits and is entered via the keypad.

5.5.2.2 Pause After First Digit

This entry is used when a 2 second delay is needed after the first digit is sent and before the remaining numbers are dialed. This feature is enabled or disabled via the **Tog** button.

5.5.2.3 Dial-Out Feature

This entry allows the user to choose whether to dial out via a tone or a pulse. The value can be changed via the **Tog** key.

5.5.2.4 Number of Attempts before Alarm

This entry will allow the user to select the number of dial-out attempts the modem will perform before setting an alarm. The value can be changed via the **Tog** key.

5.5.3 * *PURC* LAN Setup

These entries are used to set up the *PURC* LAN. The LAN is used in a redundant system, in a site reporter system, or when multiple stations are sharing a modem. Only the Master station can initiate messages on the LAN and only the Slaves respond to the messages sent by the Master.

5.5.3.1 *PURC* LAN Feature

This entry enables or disables the LAN feature. The value can be changed via the **Tog** key.

5.5.3.2 *PURC* LAN Type Master/Slave

This entry is used to determine if the station is a Master or a Slave. For more information on system setup for Redundancy, refer to Station Configuration section 68P81085E81. The value can be changed via the **Tog** key.

5.5.3.3 *PURC* LAN Type - Site Reporter/Normal

This entry is used to determine if the station is a site reporter or a station.

5.5.3.4 Alarm on Invalid Attempts

This entry is used to determine the number of attempts a Master can make to communicate with a Slave on the LAN before issuing an alarm. The value can be changed via the **Tog** key.

5.5.3.5 *PURC* LAN ID

This entry is used to program the station's *PURC* LAN ID. Each station on the LAN must be given a LAN ID in the range of 0–255. The Master station must always have a LAN ID of 0; therefore, no Slave may have an ID of 0. The value is changed by entering a new number value via the keypad.

5.6 ACCESS DISABLE

The **Acc Ds** (Access Disable) key, is used to disable the station from remote keyup request while allowing the station to key locally. If access disabled, then the **Disable** LED will light and the station will be disabled from remote keying and diagnostics. The **Tog** key is use to change the value.

5.7 ALARM SETUP

These entries are used to set up alarm conditions in the station.

5.7.1 Forward Power Alarm Point

This entry contains the Forward RF Power Alarm Trip Point. The forward power is measured whenever the station is keyed. If the power falls below this trip point, then an alarm is issued. The trip point value range is from 0 to 1023 watts, in 1 watt increments. Refer to Station Configuration section 68P81085E81 for the appropriate value setting.

5.7.2 Reflected Power Alarm Point

This entry contains the Reflected RF Power Alarm Trip Point. The reflected power is measured whenever the station is keyed. If the power rises above this trip point then an alarm is issued. The trip point value range is from 0 to 1023 watts in 1 watt increments. Refer to Station Configuration section 68P81085E81 for appropriate value setting.

5.7.3 Tray Temperature Alarm Point

This entry contains the Station Temperature Alarm Trip Point. If the tray temperature exceeds this trip point, then an alarm is issued. The trip point ranges from +40 C to +120 C in 1 Celsius degree increments. To enter a number, use the keypad.

5.7.4 *Redundancy Switchover Alarms

The following entries are used in a Redundancy setup and are needed to base switchover priority. Each alarm can be selected as a Critical or a General alarm or not be selected at all. Critical alarms have the highest priority. If the alarm is not selected then it will not be considered as a switchover alarm. To access the menu, press the **Ent** key. The PA FAULT entry and its value will appear. To get to the remaining entries use the up/down keys. When an entry needs to be modified, select the entry by depressing the **Ent** key. The value will begin to flash. Use the **Tog** key to go through the possible choices. When the choice is made, depress the **Ent** key to select the choices and continue through the menu. To access the next main menu heading, depress the **Exit** key once. The following is an ordered list of the alarms. For a description of the alarms, refer to paragraph 5.10.2.

PA FAULT 1
PA FAULT 2
PA CUTBACK
SYNTHESIZER OUT OF LOCK
LOW FORWARD POWER
HIGH REFLECTED POWER
HIGH VSWR
TX IN LIMIT
LOW INPUT LEVEL
HIGH INPUT LEVEL
HIGH TRAY TEMPERATURE
BATTERY REVERT
STATION EXECUTED A RESET
DIAGNOSTICS FAILURE
SYSTEM TIMER

5.7.5 Alarm/Verification Relay

This sub-menu entry allows the user to set up the alarm/verification relay and the alarms that will affect the relay operation.

5.7.5.1 Relay Feature

This entry will allow the user to select whether the relay is to be Disabled, Enabled in Alarm Mode, or Enabled in Verify Mode. The Alarm mode will cause the relay to activate if a selected alarm becomes active. The Verify mode will cause the relay to activate if there are no selected alarms upon station keyup. The entry choices will be: Relay Disable, Alarm Mode, or Verify Mode. The **Tog** key is used to access the menu choices.

5.7.5.2 Options Alarms

The following is a list of entries for the Option Alarms that can be used to activate the relay. A complete description of the alarms can be found in paragraph 5.10.1. The entries can be chosen as either selected or not selected and are changed via the **Tog** key. They all refer to the operation of the Relay.

PHONE LINE DELTA DELAY
FREQUENCY DRIFT EXCEEDS THRESHOLD
HSO CLOCK FAILURE
BINARY AIRTIME OVERFLOW
ANALOG AIRTIME OVERFLOW
BINARY TIMEOUT DEKEY
ANALOG TIMEOUT DEKEY
BINARY KEYCOUNT OVERFLOW

ANALOG KEYCOUNT OVERFLOW
REDUNDANCY SWITCHOVER OCCURRED

5.7.5.3 Station Alarms

The following is a list of entries for the Station Alarms that can be used to activate the relay. A complete description of the alarms can be found in paragraph 5.10.2. The entries can be chosen as either selected or not selected and are changed via the **Tog** key. They all refer to the operation of the Relay.

PA FAULT 1
PA FAULT 2
PA CUTBACK
SYNTHESIZER OUT OF LOCK
LOW FORWARD POWER
HIGH REFLECTED POWER
HIGH VSWR
TX IN LIMIT
LOW INPUT LEVEL
HIGH INPUT LEVEL
HIGH TRAY TEMPERATURE
BATTERY REVERT
STATION EXECUTED A RESET
DIAGNOSTICS FAILURE
SYSTEM TIMER

5.7.5.4 Miscellaneous Alarms

The following is a list of entries for the Miscellaneous Alarms that can be used to activate the relay. A complete description of the alarms can be found in paragraph 5.10.4. The entries can be chosen as either selected or not selected and are changed via **Tog** key. They all refer to the operation of the Relay.

WILDCARD INPUT 1
WILDCARD INPUT 2
WILDCARD INPUT 3
WILDCARD INPUT 4
WILDCARD INPUT 5
WILDCARD INPUT 6
WILDCARD INPUT 7
WILDCARD INPUT 8
PAGING KEYUP DISABLE
RS232 - NO MODEM
RS232 - MODEM FAILURE
RS232 - LINE FAILURE
PURC LAN - LINE FAILURE
*PICB - LINE FAILURE
EE DATA MODIFIED

5.8 STATION ALIGNMENT

These entries allow the user to align the station. Menu entries have been grouped together under similar titles. To activate the mode, press the **Ent** key, and to clear the mode, press the **Exit** key. Refer to Station Alignment section 68P81085E82 for station alignment details.

5.8.1 Receiver Level Adjustment

The MEASURE DE-EMPHASIZED RX LEVEL function allows the user to measure receiver audio output.

5.8.2 Transmit Deviation Adjustment

The following is list of the Tx deviation alignment functions.

INPUT AUDIO LEVEL
CALIBRATE VCO
  VCO1
  VCO2
  VCO3
  VCO4
  VCO5
  VCO6
  VCO7
NOMINAL DEVIATION
CARRIER HSO
BINARY + REFERENCE
BINARY - REFERENCE
CARRIER VCXO
BINARY + DIG
BINARY - DIG
BINARY INST

5.8.3 Line 2 Output Audio Adjustment

The OUTPUT AUDIO/EXT SOURCE and INPUT AUDIO/INT SOURCE functions (separate menu selections) allow the adjustment of the line 2 output audio level for either externally sourced or micro-controller generated audio.

5.8.4 Calibrate Wattmeter

This function allows the user to calibrate the internal station wattmeter. When the function is invoked, measured power out is displayed on the front panel. Entering the actual power out, as read from an external power meter, allows the station to calibrate the internal station wattmeter.

5.9 SERVICE MODE

Station functions include several special modes intended to aid in troubleshooting and maintenance.

5.9.1 Key and Read Power

This mode allows the user to key the station with a silent carrier and display output power. The display scrolls the values for Forward Power, Reflected Power, and VSWR. To stop the display from scrolling, depress the **Tog** key. To resume scrolling, depress the **Tog** key. The mode may be used to adjust or verify the forward power adjustment.

5.9.2 Key Analog Pass Audio

This mode allows the user to key the station and pass externally sourced audio to the transmitter modulator.

5.9.3 Key Analog 1 KHz

This mode keys the station and modulates the transmitter with a software generated 1012.5 Hz tone at the nominal station deviation.

5.9.4 Key Binary Pass Data

This mode allows the user to key the station in the binary mode, modulating the transmitter with external paging data.

5.9.5 *Diagnostic Loopback Test

This mode gates the exciter audio back to the normal audio input for board diagnostic testing.

5.9.6 PA Service Mode

Often, power amplifier deck problems are difficult to troubleshoot because the power control circuitry does not allow the station to remain keyed with a PA fault for more than 30 milliseconds. This mode disables the 30 millisecond timer, allowing the transmitter to key so that power amplifiers may be diagnosed.

WARNING

The PA Service Mode allows the transmitter to key even though the power control loop may not be closed. The station has the capability to produce potentially damaging levels of RF power in this mode. Extreme caution should be exercised when invoking this mode.

5.9.7 User Audio

5.9.7.1 Select Source

The following test points can be selected for monitoring at the **Usr Aud** jack, routing to the speaker (on RMP or DMP), and displaying of measured level. Selections are made using the **Tog** key.

None
TP4: Input audio
TP5: Gained audio
TP6: DSP Input Audio
TP7: Exciter Audio
TP8: Rx Audio
TP9: Line 2 Audio

5.9.7.2 Speaker Volume

This entry allows for setting DMP/RMP speaker volume. Four levels of volume can be selected using the **Tog** key.

5.9.7.3 Display Voltage

This function displays the current level of the selected signal. If "None" is selected, the 13.8 voltage level will be displayed.

5.10 ALARMS

These entries allow the user to check which alarms are active. Only those alarms set active will be displayed. Alarms can be cleared either locally or via the controller. To clear alarms locally, press the **Ent** key to select the alarm. Next, press the **Tog** key followed by the **Ent** key to lock in the value.

5.10.1 Option Alarms

5.10.1.1 Phone Line Delta

Alarm is active when the ACB detects a change in the control path's propagation delay that exceeds the user specified threshold.

5.10.1.2 Frequency Drift Exceeds Threshold

Alarm is active when the ACB detects a change in the reference oscillator (and therefore in carrier frequency) that exceeds the user specified threshold.

5.10.1.3 HSO Clock Failure

Alarm is active when the HSO clock is not functioning while Delta Delay Detect or Frequency Drift function is enabled.

5.10.1.4 Binary Airtime Overflow

Alarm is active when the ACB's airtime counter, for binary key-ups, overflows its upperbound. This may occur if the counter is not properly reset by the controller.

5.10.1.5 Analog Airtime Overflow

Alarm is active when the ACB's airtime counter, for analog key-ups, overflows its upperbound. This may occur if the counter is not properly reset by the controller.

5.10.1.6 Binary Timeout Dekey

Alarm is active when station dekeys during a binary key for a reason other than a proper de-key command. This may occur if the dekey message is missed resulting in the Drop Out Delay forcing a dekey.

5.10.1.7 Analog Timeout Dekey

Alarm is active when station dekeys during an analog key for a reason other than a proper dekey command. This may occur if the dekey message is missed resulting in the Drop Out Delay forcing a dekey.

5.10.1.8 Binary Key Count Overflow

Alarm is active when the ACB's counter, of binary key-ups, overflows it upperbound. This may occur if the counter is not properly reset by the controller.

5.10.1.9 Analog Key Count Overflow

Alarm is active when the ACB's counter, of analog key-ups, overflows its upperbound. This may occur if the counter is not properly reset by the controller.

5.10.1.10 Redundancy Switch Occurred

This alarm indicates that the station was switched out of the system due to an active Redundancy Switchover Alarm.

5.10.2 Station Alarms

5.10.2.1 PA Fault 1

Alarm is active when a key request is present, but PA ON is not active.

5.10.2.2 PA Fault 2

Alarm is active when PA ON is active, but there is no key request.

5.10.2.3 PA Cutback

Alarm is active when **PA On** is active, but the **PA Ful** LED is not lit, indicating a transmitter fault. When PA CUTBACK is active, the station is operating at reduced power out.

5.10.2.4 Sythesizer Out of Lock

Alarm is set active when the transmitter is not locking to programmed frequency. Alarm value is constantly being updated.

5.10.2.5 Low Forward Power

Alarm is active when forward power drops below the forward power alarm threshold.

5.10.2.6 High Reflected Power

Alarm is active when reflected power rises above the reflected power alarm threshold.

5.10.2.7 High VSWR

Alarm is active when measured VSWR exceeds 5.0.

5.10.2.8 TX in Limit

Alarm is active when the transmitter modulation circuitry limits output deviation to Maximum Deviation.

5.10.2.9 Low Input Level

Alarm is set active when the station's input audio falls below the minimum level.

5.10.2.10 High Input Level

Alarm is set active when the station's input audio exceeds the maximum level.

5.10.2.11 High Tray Temperature

Alarm is set active when the control tray's ambient temperature exceeds the Tray Temperature Alarm Trip Point.

5.10.2.12 Battery Revert

Alarm is set active when the station switches to battery power.

5.10.2.13 Station Executed a Reset

Alarm is set active when the station executes any reset.

5.10.2.14 Diagnostics Failure

Alarm is set active when the station has a diagnostics failure. (This alarm can only become active during a reset sequence.)

5.10.2.15 System Timer

Alarm is activated whenever the system timer elapses. The system timer is restarted at every key-up. If the station remains idle for a time longer than the system timer value, the alarm will be activated.

5.10.3 Communications Alarms

These entries detail the communications alarms. The first 7 alarm types are common to all communication modes and are only defined in the MDC section.

5.10.3.1 MDC Communications Alarms

MDC Rx Failed CRC: Indicates the incoming message failed the CRC check. The CRC in a message is similar to a checksum value. When a message fails to pass the CRC check, it is considered a bad message and is discarded.

MDC Rx Wrong System ID: This alarm indicates that the received message contained the wrong system ID.

MDC Rx Undefined Register: The alarm indicates that the message was a command to read a register that is not defined or illegal to read.

MDC Rx Undefined Command: The alarm indicates that the received messaged was to execute a command that is not defined.

MDC Rx Protected Register: This alarm indicates that the command was to write to a register that cannot be written.

MDC Rx Invalid Sequence: This alarm indicates that a message was received out of sequence. For example, a command was sent that requires 2 messages and only 1 was received. The station then waits for the second message but receives another message with a different command. Since the received message was not the expected second message, the ACB ignores both commands and sets the alarm.

MDC Rx System ID Access: This alarm indicates that there was an attempt to write to the system ID when access to the system ID was not allowed.

5.10.3.2 RS232 Communications Alarms

The first 7 entries are described in the MDC section 5.10.3.1.

RS232 Failed CRC
RS232 Wrong System ID
RS232 Undefined Register
RS232 Undefined Command
RS232 Invalid Sequence
RS232 System ID Access

RS232 Dial-In Invalid Password: This entry indicates that an invalid attempt to login to the station via the RS232 communications port occurred.

RS232 Dial-In Timeout: This alarm indicates that the RS232 port was inactive for more than five minutes and therefore the station was forced to disconnect prior to a LOGOUT.

RS232 Dial-Out Maximum Retries: This entry indicates that the station tried dialing out to the controller and was unable to connect even though several attempts were made.

RS232 No Dial-Out Phone Number: This entry indicates that the station attempted to dial-out but was unable to, because a dial-out phone number was not programmed.

5.10.3.3 LAN Communications Alarms

The first 7 entries are described in the MDC section 5.10.3.1.

LAN Failed CRC
LAN Wrong System ID
LAN Undefined Register
LAN Undefined Command
LAN Protected Register
LAN Invalid Sequence
LAN System ID Access

LAN Master Poll Timeout: This alarm will only be set in stations that are set up as SLAVES and will be set if a SLAVE in a redundant system is not polled by the MASTER within a specified time period.

LAN Slave No Response: This alarm will only be set in stations that are set up as MASTERs and will be set if a SLAVE station failed to respond to a MASTER's request.

5.10.3.4 *PICB Communications Alarms

The first 7 entries are described in the MDC paragraph 5.10.3.1.

PICB Failed CRC
PICB Wrong System ID
PICB Undefined Register
PICB Undefined Command
PICB Protected Register
PICB Invalid Sequence
PICB System ID Access

5.10.4 Miscellaneous Alarms

5.10.4.1 Wildcard Input 1-8

These are 8 separate entries providing the status on the 8 input lines. The wildcard inputs were previously described in paragraph 5.4.6.

5.10.4.2 Paging Keyup Disable

This alarm indicates that the station has been disabled from remote paging keyups although remote diagnostics are allowed.

5.10.4.3 RS232 - No Modem

This alarm indicates that the station was enabled for smart modem operation but no modem was connected.

5.10.4.4 RS232 - Modem Failure

This alarm indicates that the modem failed during communications with the controller.

5.10.4.5 RS232 Line Failure

This alarm indicates a modem failure due to a phone line interruption.

5.10.4.6 *PURC* LAN - Line Failure

This alarm indicates that the LAN failed.

5.10.4.7 EE Data Modified

This alarm indicates that a change has been made to a parameter stored in non-volatile memory (EEPROM) via a means other than a controller.

5.10.5 Momentary Alarms

These alarms are the same alarms as the STATION Alarms but occurred only momentarily. The following is a list of the alarms as they appear on the display.

PA FAULT 1
PA FAULT 2
PA CUTBACK
SYNTHESIZER OUT OF LOCK
LOW FORWARD POWER
HIGH REFLECTED POWER
HIGH VSWR SHUTDOWN
TX IN LIMIT
LOW INPUT LEVEL
HIGH INPUT LEVEL
HIGH TRAY TEMPERATURE
BATTERY REVERT
STATION EXECUTED A RESET
DIAGNOSTICS FAILURE
SYSTEM TIMER

5.11 STATION STATUS

The following is a list of status-only values describing the station's current state.

5.11.1 PTT Active

This entry will indicate the source of the key request.

5.11.2 Disable

This entry will indicate the source of the disable condition.

5.11.3 Forward Power

This entry displays the forward power value from the last station keyup. For a current power reading, refer to Service Mode paragraph 5.9.1.

5.11.4 Reflected Power

This entry displays the reflected power value from the last station keyup. For a current power reading, refer to Service Mode paragraph 5.9.1.

5.11.5 VSWR

This entry displays the VSWR value only if the station is performing an RF key. Otherwise, the value displayed will be zero.

5.11.6 Tray Temperature

This entry gives the current reading of the Advanced Control tray's ambient temperature.

5.11.7 Firmware Version

This entry gives the version number of the station's software.

5.11.8 UHSO Drift

This entry gives the current UHSO drift reading.

5.11.9 *Redundancy Status

The following is a list of items selectable under the redundancy status menu.

5.11.9.1 Redundancy Function

This entry displays whether or not the station is in a redundant system.

5.11.9.2 Slave Status

This menu choice is only applicable to those stations that are setup as SLAVES. If the station is set up as a MASTER, go to the next menu choice. This menu will detail whether the station is currently active in the system or if it has been switched out of the system.

5.11.9.3 Master Status

This menu choice is applicable only to those stations set up as MASTERS.

SWITCHED FOR A SLAVE: This entry will indicate if the MASTER station has switched into the system.

SWITCHED STATION ID: This entry will indicate which station the MASTER has switched out of the system.

SWITCHOVER UPON ALARM: This entry indicates if the MASTER station is permitted to switchover to another station. This entry is a result of a forced switchover from a controller.

CAUSE OF SWITCHOVER: This entry indicates why the MASTER station switched into the system. The cause of switchover could be due to an ALARM or FORCED switchover.

5.11.10 Rx Squelched/Rx Unsquelched

This entry indicates status of the station's receiver.

5.12 RESET STATION

To perform a power reset on the station, depress the **Rst** key on the lower right of the control panel. This will cause the station to go through power-up diagnostics and reset all RAM values. The Alarm LED will light to indicate a RESET occurred. To clear this alarm, enter the Alarm menu and go to Station alarms and clear the RESET alarm. Refer to paragraph 5.10 for more details on clearing alarms. See paragraph 4.5.1 for further details on power-up diagnostics.

5.13 CONTROL PANEL OPERATION EXAMPLES

Refer to the menus and control panel at the end of this section.

Example 1: Check the status of Input Audio, and select Link if it is not already selected.

Step 1. Find the sub- menu that contains Input Audio. (Input Audio is located under PARAMETERS below RX AUDIO.)

Step 2. Depress the **Rx** key (same as key No. 7). The display will read RX AUDIO.

Step 3. Press the down arrow key [▼] to traverse down the menu selections. Once the display reads INPUT AUDIO, press the **Ent** key to select that entry.

Step 4. The display will show the source of Input Audio as either LINE, LINK, or AUX. If LINK is not displayed, press the **Ent** key and the display should begin to flash. Press the **Tog** key to display the menu choices.

Step 5. Once LINK is displayed, press the **Ent** key again to set the value. If the enter key is not depressed, the new value will not be saved.

Example 2: Setting Gain Value for -5.3 dB.

Step 1. Find the sub-menu that contains Gain (Value). Gain (Value) is located under PARAMETERS below RX AUDIO.

Step 2. Depress the **Rx** key. The display will read RX AUDIO.

Step 3. Press the down arrow key [▼] to traverse down the menu selections. Once the display reads GAIN X.X dB (X.X is equivalent to the gain value currently stored), press the **Ent** key to select the entry.

Step 4. The value will be flashing and will continue to flash until a number is entered. Enter the number 5 followed by a 3. The number 5.3 will appear in the display.

Step 5. Use the **Tog** key to toggle to the negative sign. (The **Tog** key is used to toggle between positive and negative values, however, the positive sign does not appear on the display.)

Step 6. Press the **Ent** key to set the value. The display will scroll to GAIN -5.3 dB.

Step 7. To exit the menu and return to the READY state, press the **Exit** key once. If the **Exit** key is pressed before the **Ent** key, then the value entered is not saved and the value will revert to the previous value.

Example 3: Enable the RS232 Dial In feature.

Step 1. Locate the sub-menu that contains Dial In Enable/Disable. (Dial In Enable/Disable is located under OPT 2 - COMM OPTIONS below RS232 Dial In Setup.

Step 2. Depress the **Opt 2** key (same as the down key). The display will read OPTNS 2 followed by the first menu entry, RS232 Dial In Setup. The display will then continuously scroll RS232 Dial In Setup.

Step 3. Press the **Ent** key to select RS232 Dial In Setup. The display will read Dial In Enable or Dial In Disable depending on its current state.

Step 4. To change the setting, press the **Ent** key and use the **Tog** key to select between ENABLE or DISABLE. Once the selection is made, press the **Ent** key to save the selection. The display will read Dial In Enable if enable was chosen or Dial In Disable if disable was chosen.

Step 5. To exit the menu and return to the READY state, press the **Exit** key 2 times. Note: If the **Exit** key is pressed before the **Ent** key, the value selected will not be saved and the value will revert to the previous value.

Table 5. Operational Error Codes		
Error Code	Display Error Description	Error Description
$00	DIAG RST	Diagnostics Reset – caused by a previous diagnostics failure
$01	COP RST	COP error – caused by the HC11 hardware COP
$02	CLK RST	Clock monitor error – caused by the HC11 hardware clock monitor
$03	INTR RST	Illegal Opcode Interrupt Error
$04	INTR RST	Software Interrupt Error
$05	INTR RST	Real Time Interrupt error
$06	INTR RST	Output compare 1 interrupt error
$07	INTR RST	Pulse accumulator edge interrupt error
$08	INTR RST	Reserved Interrupt error
$0F	XIRQ INT	XIRQ Interrupt error
$10–$18	DSP VDAT	DSP Vector 12–1A no response error
$19–$21	DSP VSRV	DSP Vector 12–1A not serviced
$22	DSP WR	DSP write verification failed
$23	DSP STAT	DSP not incriminating Status register
$24	DSP ALRM	DSP SRAM Checksum Failed
$25	DSP ALRM	DSP STACK Error occurred
$26	DSP ALRM	DSP Illegal Host Command Instruction received
$27	DSP ALRM	DSP Illegal Instruction executed
$40	uC REGS	HC11 Register Test Failure
$41	ROM CHK	EPROM Checksum Failure Bank 0
$42	ROM CHK	EPROM Checksum Failure Bank 1
$43	INT RAM	Internal RAM Failed write backward/read forward
$44	INT RAM	Internal RAM Failed write forward/read backward
$45	INT RAM	Internal RAM Failed write/read 00
$46	uC TIMER	Timer OCR1 Failure
$47	uC TIMER	Timer OCR2 Failure
$48	uC TIMER	Timer OCR3 Failure
$49	uC TIMER	Timer OCR4 Failure
$4A	uC TIMER	Timer OCR5 Failure
$50–$57	STN ASIC	Station ASIC Failure
$58	STN ASIC	Station ASIC Mux Bus Failure
$59–$60	IOM ASIC	IO ASIC Failure
$70–$79	PSC ASIC	PSCB ASIC LAN Failure
$7A–$83	PAC ASIC	PSCB ASIC PICB Failure
$84–$87	PSC ASIC	PSCB ASIC MDC Tx 1200 Failure
$88–$8B	PSC ASIC	PSCB ASIC MDC Tx 1800 Failure
$8c–$8f	PSC ASIC	PSCB ASIC MDC Tx 387 Failure
$90–$94	PSC ASIC	PSCB ASIC Reference Clock Failure
$B0–$B4	EXT RAM	External RAM Failure
$B5–$B9	ERLG RAM	External RAM Error Log Failure
$BA	BANK RAM	External RAM BANK Select Failure
$BB–$BF	BANK RAM	External RAM BANK 1 Failure
$C0–$C4	BANK RAM	External RAM BANK 2 Failure
$C5–$C9	BANK RAM	External RAM BANK 3 Failure

$CA-$CE	BANK RAM	External RAM BANK 4 Failure
$CF-$D3	BANK RAM	External RAM BANK 5 Failure
$D4-$D8	BANK RAM	External RAM BANK 6 Failure
$D9-$DB	BANK RAM	External RAM BANK Failure
$F0	CNFG REG	Configuration Register - Bad uC Mode (Not SP)
$F1	CNFG REG	Configuration Register - Configuration Register Written
$F2	INT EEPM	Internal EE - Bad ID - EE Programmed
$F3	INT EEPM	Internal EE - Bad Format - EE Programmed
$F4	INT EEPM	Internal EE - Bad Erase
$F5	INT EEPM	Internal EE - Bad Write
$F6	EXT EEPM	Internal EE - Dip Switch caused Reprogram
$F7	EXT EEPM	Internal EE - EPROM Override Programming
$FF	PWR RST	Power Reset Occurred
$140	DSP INIT	DSP BAD Power On Reset Configuration
$141	DSP LD1	DSP DIAGNOSTICS 1 Download Failure
$142	DSP LD1	DSP DIAGNOSTICS 1 Register Test No RSVP Failure
$143	DSP LD1	DSP DIAGNOSTICS 1 Register Test Wrong Mode Failure
$144	DSP INT1	DSP DIAGNOSTICS 1 DSP Interrupt occurred
$145	DSP REGS	DSP DIAGNOSTICS 1 Register Test Unknown Response
$146	DSP REGS	DSP DIAGNOSTICS 1 Register Test Failed ACCA, ACCB
$147	DSP REGS	DSP DIAGNOSTICS 1 Register Test Failed X, Y
$148	DSP REGS	DSP DIAGNOSTICS 1 Register Test R, M, N
$149	DSP REGS	DSP DIAGNOSTICS 1 Register Test R, M, N
$14A	DSP ERAM	DSP DIAGNOSTICS 1 External RAM No RSVP Failure
$14B	DSP ERAM	DSP DIAGNOSTICS 1 External RAM Wrong Mode Failure
$14C	DSP INT1	DSP DIAGNOSTICS 1 DSP Interrupt occurred
$14D-$15C	DSP ERAM	DSP DIAGNOSTICS 1 External RAM
$15D	DSP LD2	DSP DIAGNOSTICS 2 Download Failure
$15E	DSP LD2	DSP DIAGNOSTICS 2 Internal RAM No RSVP Failure
$15F	DSP LD2	DSP DIAGNOSTICS 2 Internal RAM Wrong Mode Failure
$160-$17E	DSP INT2	DSP DIAGNOSTICS 2 DSP Interrupt
$17F-$18E	DSP IRAM	DSP DIAGNOSTICS Internal RAM
$18F-1A0	DSP CVEC	DSP HOST Vector 12-19 Failure - Bad Data/No Response
$1A1-$1A8	DSP HFLG	DSP HOST Vector 1A Failure - Host Flags Failure
$1A9-$1AC	DSP SCI	DSP HOST Vector 1B Failure - DSP SCI/HC11 SPI Failure
$1AD-$1B5	DSP SCO1	DSP HOST Vector 1C Failure - SC0/SC1 Failure
$1B6-$1B9	DSP ANLG	DSP HOST Vector 1D Failure - 9600 Clock Failure
$1BA-$1BD	DSP ANLG	DSP HOST Vector 1D Failure - Analog Tone Failure
$1BE-$1C3	DSP BNRY	DSP HOST Vector 1D Failure - Binary Data Failure
$1C4	DSP LD3	DSP HOST Vector 1E Failure - Download Failure
$1D0-$1D7	L2 LEVEL	Board MDC Tx Failure - Line 2 Failure
$1D8-$1DB	LOOPBACK	Board Loopback Failure - Input Audio Failure
$1DC-$1E3	LOOPBACK	Board Loopback Failure - Gained Audio Failure
$1E4-$1EF	DELAY	Board Loopback Failure - DSP Input Audio Failure
$1F0-1FA	DELAY	Board Loopback Failure - Delay Failure

PARAMETERS

STN – STATION

- * Base Stn/Link Tx
- Freq Range
- Frequency Range Checking En/Dis
- Station ID
- DRC Setup
  - * DRC/TRC Mode
  - System ID
  - Polled Response via Line 2/RF
- Drop Out Delay
- Timeout Timer Value/Disable
- System Timer Alarm Value/Disable
- Password
- * TRC Tone Table Selection
- * Guard Tone Frequency
- Current Channel
- Front Panel Password En/Dis
- Wattmeter Element
- * Serial Number
- PURC/PURC 5000

RX – RECEIVE AUDIO

- Delay Enable/Disable
- Delay (Value)
- Gain Enabled/Disable
- Gain (Value)
- Input Audio from Line/Link/Aux
- * AGC Enable/Disable
- Buffered Audio Output En/Dis
- Line 2 Audio from Receiver/Aux/None
- Line 2 Audio Flat/De-Emphasis
- Rx DPL/PL Enable/Disable

TX – TRANSMIT

- Remote Frequency Adjust Enable/Disable
- Remote Frequency Adjust (steps)
- Channel Frequencies
  - Channels 1 – 32
- Tx Deviation Setup
  - Maximum Deviation
  - Nominal Deviation
  - Nominal Binary Deviation
- * Tx DPL/PL Setup
  - Tx PL/DPL/Enf/Dis
  - Tx PL Freq
  - DPL Code
- Flat/Pre-Emphasis
- G.T. Notch Enable
- Special Tx Setup
  - Audio Phase Inversion En/Dis
  - Binary Tx Data Inversion En/Dis
  - Tx = Rx Enable/Disable

ACC DS – ACCESS DISABLE

- Access En/Dis

ALSET – ALARM SETUP

- Fwd Power Alarm Point
- Rfl Power Alarm Point
- Tray Temperature Alarm Point
- * Redundancy Switchover Alarms
  - Critical / General /Not Selected
    - PA Fault 1
    - PA Fault 2
    - PA Cutback
    - Synthesizer Out of Lock
    - Low Forward Power
    - High Reflected Power
    - High VSWR
    - Tx in Limit
    - Low Input Level
    - High Input Level
    - High Tray Temperature
    - Battery Revert
    - Station Executed a Reset
    - Diagnostics Failure
    - System Timer
  - Alarm/Verification Relay
    - Relay Disable/Alarm Mode/Verify Mode
    - Opt Alarm – Selected/Not Selected
      - Phone Line Delta Delay
      - Freq Drift Exceeds Threshold
      - HSO Clock Failure
      - Binary Airtime Overflow
      - Analog Airtime Overflow
      - Binary Timeout Dekey
      - Analog Timeout Dekey
      - Binary Key Count Overflow
      - Analog Key Count Overflow
      - Redundancy Switch Occurred
    - Stn Alarm – Selected/Not Selected
      - PA Fault 1
      - PA Fault 2
      - PA Cutback
      - Synthesizer Out of Lock
      - Low Forward Power
      - High Reflected Power
      - High VSWR
      - Tx in Limit
      - Low Input Level
      - High Input Level
      - High Tray Temperature
      - Battery Revert
      - Station Executed a Reset
      - Diagnostics Failure
      - System Timer
    - Misc Alarm – Select/Not Selected
      - Wild Card Inputs 1 – 8
      - Paging Keyup Disable
      - RS232 – No Modem
      - RS232 – Modem Failure
      - RS232 – Line Failure
      - PURC LAN – Line Failure
      - * PICB – Line Failure
      - EE Data Modified

OPT 1 – STATION OPTIONS

- Antenna Relay En/Dis
- * Auto ID Setup
  - Auto ID En/Dis
  - ID Interval
  - ID on Channel 00
  - Auto ID (12 digit Value)
- Special Key Setup (select one)
  - Special Key Disable or
  - Key on Internal CD or
  - Key on External CD or
  - Key on Fast Key Req Active Low or
  - Key on Fast Key Req Active High or
  - Ext Key Req Active Low or
  - Ext Key Req Active High
- Delta Delay Setup
  - Delta Delay En/Dis
  - Delta Delay Threshold
  - Key Up En/Dis if Alarm
- Freq Measurement Setup
  - Freq Measurement En/Dis
  - Freq Drift Threshold
  - Intentional Frequency Offset
- Wild Card Input Setup
  - Wild Card 1 – 8 Active HI/LO
- Wild Card Output Setup
  - Wild Card 1 – 8 Active/Inactive
- Monitor Rx Setup
  - Rx Enable/Disable
  - Rx Ext/Int to Station
- * Redundancy Setup
  - Redundancy En/Dis
  - Master Station Setup Only
    - Number of Stns in System
    - Prioritization Enable/Disable
    - Key Up Enable/Disable
    - Switchover to Station (station ID)
- External Paging Data Setup
  - Delay Analog/Digital Path
  - Binary Data Internal/External
  - RS232/Ext Modem Rx Data
- PA Shutdown on High VSWR Enable/Disable
- Unsolicited Alarm Reporting
  - Unsolicited Alm En/Dis
  - Report via Line2/RS232
  - * Report via DRC/ASCII

OPT 2 – COMM OPTIONS

- RS232 Dial In Setup
  - Dial In Enable/Disable
  - Alarm on Number of Invalid Attempts
  - Action Upon Invalid Attempt Alarm
  - Auto Baud Detect Enable/Disable
  - Baud Rate
  - Smart Modem/No Modem
- RS232 Dial Out Setup
  - Dial Out Phone Number (18 digits max)
  - Pause After First Digit
  - Dial Out Via Tone/Pulse
  - Number of Attempts Before Alarm
- * PURC LAN Setup
  - PURC LAN Enable/Disable
  - PURC LAN Master/Slave
  - PURC LAN Site Reporter/Normal
  - Alarm on Number of Invalid Attempts
  - PURC LAN ID
- * PICB Setup

FUNCTIONS

ALGN - STATION ALIGNMENT

- Measure De-Emphasized Rx Level
- Input Audio Level
- Calibrate VCO
  - VCO 1
  - VCO 2
  - VCO 3
  - VCO 4
  - VCO 5
  - VCO 6
  - VCO 7
- Nominal Deviation
- Carrier HSO
- Binary +Reference
- Binary -Reference
- Carrier VCXO
- Binary +Dig
- Binary -Dig
- Binary Inst
- Output Audio/Ext Source
- Output Audio/Int Source
- Calibrate Wattmeter

SERV - SERVICE MODE

- Key and Read Power
- Key Analog Pass Audio
- Key Analog 1KHz
- Key Binary Pass Data
- * Diagnostic Loopback Test
- PA Service Mode
- User Audio
  - Select Source (select one)
    - None
    - TP4: Input Audio
    - TP5: Gained Audio
    - TP6: DSP Input Audio
    - TP7: Exciter Audio
    - TP8: Rx Audio
    - TP9: Line 2 Audio
  - Speaker Volume
  - Display Voltage

STAT - STATION STATUS

- PTT
- Disable
- Forward Power
- Reflected Power
- VSWR
- Tray Temperature
- Firmware Version
- UHSO Drift
- * Redundancy Status
  - Redundancy Enabled/Disabled
  - Slave Status
    - Switched out of System Yes/No
  - Master Status
    - Switched for a Slave Yes/No
    - Switched Station ID
    - Switch over upon Alarm Yes/No
    - Switchover Due to Alarm/Forced
- Rx Squelched/Rx Unsquelched

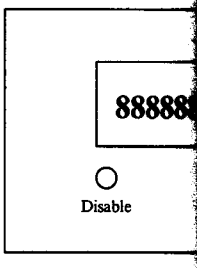
RESET - RESET STATION

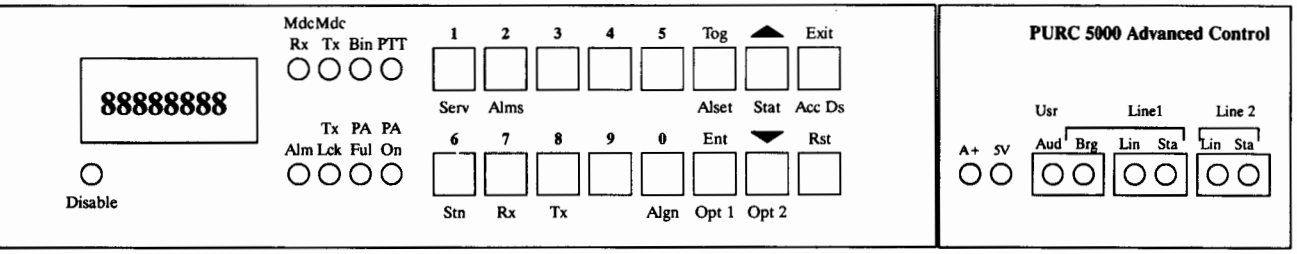
ALM - ALARMS

- Option Alarms - OPT ALMS
  - Phone Line Delta Delay
  - Frequency Drift
  - HSO Clock Failure
  - Binary Air-time Overflow
  - Analog Airtime Overflow
  - Binary Timeout Dekey
  - Analog Timeout Dekey
  - Binary Keyup Count Overflow
  - Analog Keyup Count Overflow
  - Redundancy Switchover
- Station Alarms - STN ALMS
  - PA Fault 1
  - PA Fault 2
  - PA Cutback
  - Synthesizer Out of Lock
  - Low Forward Power
  - High Reflected Power
  - High VSWR
  - Tx in Limit
  - Low Input Level
  - High Input Level
  - High Tray Temperature
  - Battery Revert
  - Station Executed a Reset
  - Diagnostics Failure
  - System Timer
- Communications Alarms
  - MDC Communications Alarms
    - MDC Rx Failed CRC
    - MDC Rx Wrong Sys ID
    - MDC Rx Undefined Reg
    - MDC Rx Undefined Cmd
    - MDC Rx Protected Reg
    - MDC Rx Invalid Sequence
    - MDC Rx System ID Access
  - RS232 Comm Alarm
    - RS232 Failed CRC
    - RS232 Wrong Sys ID
    - RS232 Undefined Reg
    - RS232 Undefined Cmd
    - RS232 Protected Reg
    - RS232 Invalid Sequence
    - RS232 System ID Access
    - RS232 Dial-In Invalid Pswd
    - RS232 Dial-In Time Out
    - RS232 Dial-Out Max Retries
    - RS232 No Dial-Out Ph #
  - LAN Comm Alarm
    - LAN Failed CRC
    - LAN Wrong Sys ID
    - LAN Undefined Reg
    - LAN Undefined Cmd
    - LAN Protected Reg
    - LAN Invalid Sequence
    - LAN System ID Access
    - LAN Master Polled Timeout
    - LAN Slave No Response
  - *PICB Comm Alarm
    - PICB Failed CRC
    - PICB Wrong Sys ID
    - PICB Undefined Reg
    - PICB Undefined Cmd
    - PICB Protected Reg
    - PICB Invalid Sequence
    - PICB System ID Access

ALM-ALARMS (Cont'd)

- Misc Alarm
  - Wild Card Inputs 1 - 8
  - Paging Keyup Disable
  - RS232 - No Modem
  - RS232 - Modem Failure
  - RS232 - Line Failure
  - PURC LAN - Line Failure
  - * PICB - Line Failure
  - EE Data Modified
- Momentary Alarm
  - PA Fault 1
  - PA Fault 2
  - PA Cutback
  - Synthesizer Out of Lock
  - Low Forward Power
  - High Reflected Power
  - High VSWR
  - Tx in Limit
  - Low Input Level
  - High Input Level
  - High Tray Temperature
  - Battery Revert
  - Station Executed a Reset
  - Diagnostics Failure
  - System Timer





Note:

The asterisk (*) signifies that the feature was not offered at the time of the printing of this manual. However, when available, the feature will operate as referenced in the manual.